Full wwPDB EM Validation Report ⓘ

Nov 3, 2024 – 07:32 AM EST

PDB ID	:	6VU3
EMDB ID	:	EMD-21386
Title	:	Cryo-EM structure of Escherichia coli transcription-translation complex A (TTC-A) containing mRNA with a 12 nt long spacer
Authors	:	Molodtsov, V.; Wang, C.; Su, M.; Ebright, R.
Deposited on	:	2020-02-14
Resolution	:	3.70 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:

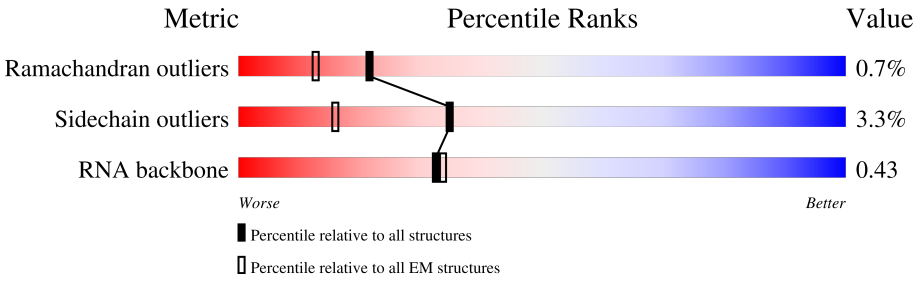
EMDB validation analysis	:	0.0.1.dev113
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 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% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	0	103	100%
2	1	110	100%
3	2	94	100%
4	3	103	28% 99%
5	4	94	100%
6	5	36	50% 47% 17% 36%
7	6	27	56% 85% 15%
8	7	29	21% 28% 69%

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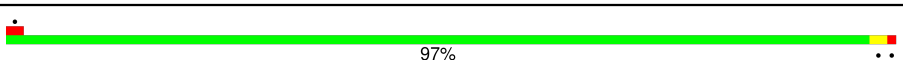
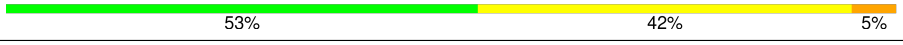
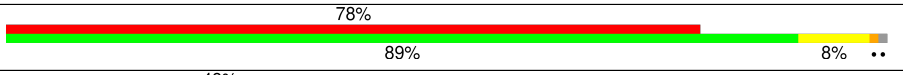
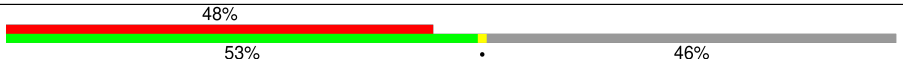
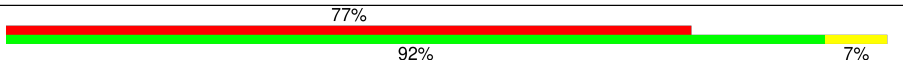
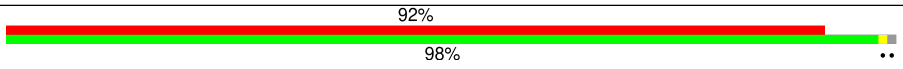
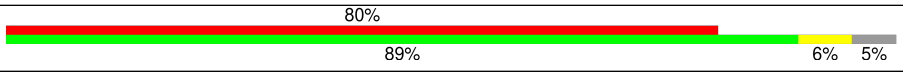
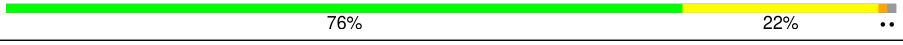
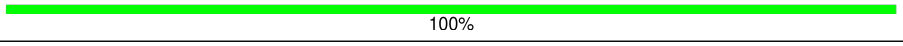
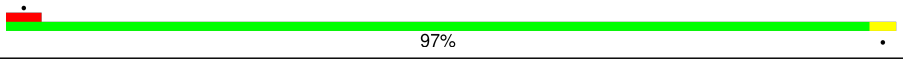
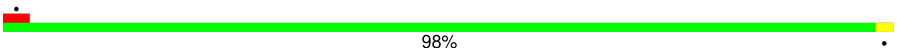
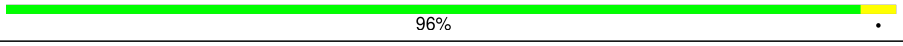
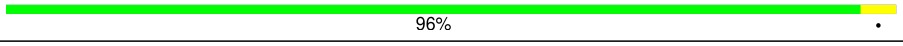
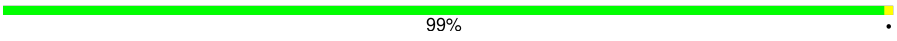
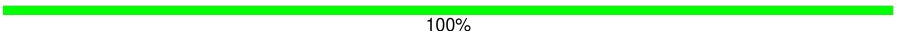
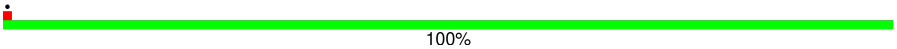
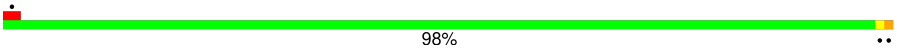
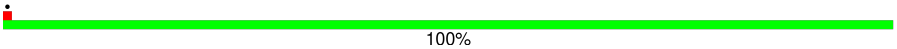
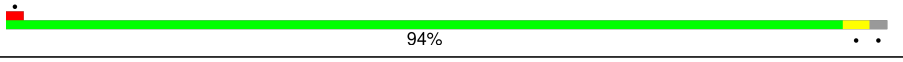
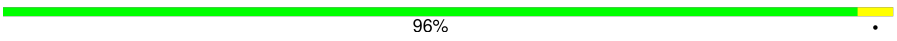
Mol	Chain	Length	Quality of chain
9	9	148	
10	A	76	
10	B	76	
11	AA	1342	
12	AB	181	
13	AC	230	
13	AD	230	
14	AE	1407	
15	C	66	
16	D	1542	
17	E	86	
18	F	70	
19	G	225	
20	H	557	
21	I	208	
22	J	205	
23	K	156	
24	L	104	
25	M	151	
26	N	129	
27	O	127	
28	P	99	
29	Q	117	
30	R	124	
31	S	100	

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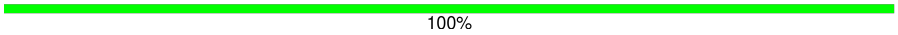
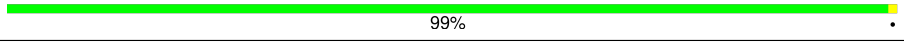
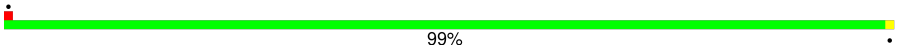
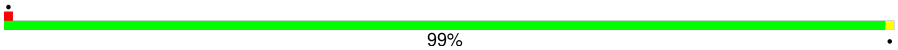
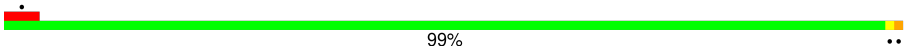
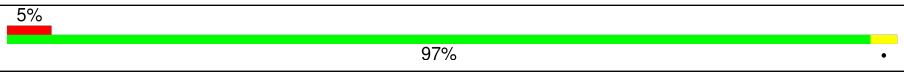
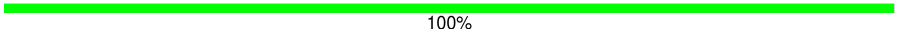
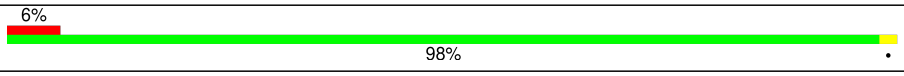
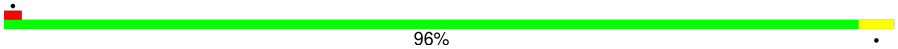
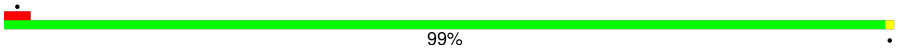
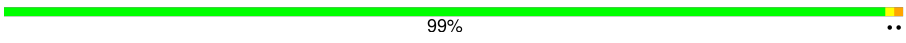
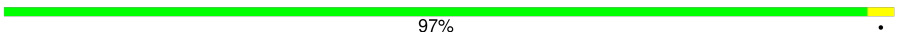
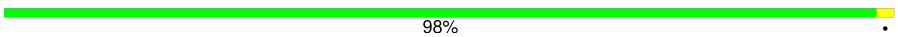
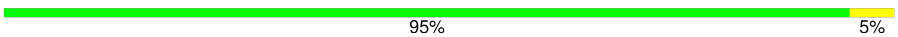
Mol	Chain	Length	Quality of chain
32	T	88	
33	U	82	
34	V	80	
35	W	83	
36	X	116	
37	Y	141	
38	Z	30	
39	a	2904	
40	b	76	
41	c	77	
42	d	120	
43	e	62	
44	f	58	
45	g	66	
46	h	271	
47	i	56	
48	j	209	
49	k	52	
50	l	201	
51	m	46	
52	n	177	
53	o	64	
54	p	175	
55	q	38	
56	r	149	

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Mol	Chain	Length	Quality of chain
57	s	142	100%
58	t	123	100%
59	u	144	100%
60	v	136	99%
61	w	119	99%
62	x	116	100%
63	y	114	99%
64	z	117	99%

2 Entry composition (i)

There are 66 unique types of molecules in this entry. The entry contains 300609 atoms, of which 124724 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 L21.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	0	103	1655	516	839	153	145	2	0	0

- Molecule 2 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
2	1	110	1779	532	922	166	156	3	0	0

- Molecule 3 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
3	2	94	1557	470	811	140	134	2	0	0

- Molecule 4 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
4	3	103	1632	498	844	148	142	0	0

- Molecule 5 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
5	4	94	1533	479	780	137	134	3	0	0

- Molecule 6 is a DNA chain called NT DNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
6	5	23	732	225	260	87	137	23	0	0

- Molecule 7 is a DNA chain called T DNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
7	6	27	Total	C	H	N	O	P	0	0
			848	259	306	89	167	27		

- Molecule 8 is a RNA chain called mRNA with 12 nt long spacer.

Mol	Chain	Residues	Atoms						AltConf	Trace
8	7	29	Total	C	H	N	O	P	0	0
			709	273	97	94	216	29		

- Molecule 9 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	9	148	Total	C	N	O	S	0	0
			1117	705	196	209	7		

- Molecule 10 is a RNA chain called E-site and A-site tRNA (fMet).

Mol	Chain	Residues	Atoms						AltConf	Trace
10	A	76	Total	C	H	N	O	P	0	0
			2446	723	826	295	527	75		
10	B	76	Total	C	H	N	O	P	0	0
			2433	723	813	295	527	75		

- Molecule 11 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms						AltConf	Trace
11	AA	1322	Total	C	H	N	O	S	0	0
			20851	6539	10426	1817	2026	43		

- Molecule 12 is a protein called Transcription termination/antitermination protein NusG.

Mol	Chain	Residues	Atoms						AltConf	Trace
12	AB	98	Total	C	H	N	O	S	0	0
			1573	505	783	139	140	6		

- Molecule 13 is a protein called DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms						AltConf	Trace
13	AC	230	Total	C	H	N	O	S	0	0
			3599	1112	1813	317	351	6		

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Mol	Chain	Residues	Atoms						AltConf	Trace
13	AD	228	Total	C	H	N	O	S	0	0
			3556	1100	1789	312	349	6		

- Molecule 14 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms						AltConf	Trace
14	AE	1335	Total	C	H	N	O	S	0	0
			21000	6526	10612	1854	1958	50		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AE	1384	VAL	MET	conflict	UNP A0A4S1NBU2

- Molecule 15 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms						AltConf	Trace
15	C	66	Total	C	H	N	O	S	0	0
			1103	344	559	102	97	1		

- Molecule 16 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
16	D	1524	Total	C	H	N	O	P	0	0
			49126	14585	16423	6003	10591	1524		

- Molecule 17 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms						AltConf	Trace
17	E	86	Total	C	H	N	O	S	0	0
			1388	414	719	138	114	3		

- Molecule 18 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms						AltConf	Trace
18	F	70	Total	C	H	N	O	S	0	0
			1218	366	629	125	97	1		

- Molecule 19 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms						AltConf	Trace
19	G	225	Total	C	H	N	O	S	0	0
			3545	1113	1785	316	323	8		

- Molecule 20 is a protein called 30S ribosomal protein S1.

Mol	Chain	Residues	Atoms						AltConf	Trace
20	H	259	Total	C	H	N	O	S	0	0
			3184	1073	1454	305	349	3		

- Molecule 21 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms						AltConf	Trace
21	I	208	Total	C	H	N	O	S	0	0
			3346	1036	1710	307	290	3		

- Molecule 22 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms						AltConf	Trace
22	J	205	Total	C	H	N	O	S	0	0
			3350	1026	1707	315	298	4		

- Molecule 23 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms						AltConf	Trace
23	K	156	Total	C	H	N	O	S	0	0
			2348	717	1196	217	212	6		

- Molecule 24 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms						AltConf	Trace
24	L	104	Total	C	H	N	O	S	0	0
			1694	536	846	153	152	7		

- Molecule 25 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms						AltConf	Trace
25	M	151	Total	C	H	N	O	S	0	0
			2416	735	1235	227	215	4		

- Molecule 26 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms						AltConf	Trace
26	N	129	Total	C	H	N	O	S	0	0
			2010	616	1031	173	184	6		

- Molecule 27 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms						AltConf	Trace
27	O	127	Total	C	H	N	O	S	0	0
			2092	634	1070	206	179	3		

- Molecule 28 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms						AltConf	Trace
28	P	99	Total	C	H	N	O	S	0	0
			1621	495	831	151	143	1		

- Molecule 29 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms						AltConf	Trace
29	Q	117	Total	C	H	N	O	S	0	0
			1764	540	887	174	160	3		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
30	R	121	Total	C	H	N	O	S	0	0
			1940	580	1001	194	161	4		

- Molecule 31 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms						AltConf	Trace
31	S	100	Total	C	H	N	O	S	0	0
			1649	499	844	164	139	3		

- Molecule 32 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms						AltConf	Trace
32	T	88	Total	C	H	N	O	S	0	0
			1448	439	734	144	130	1		

- Molecule 33 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms						AltConf	Trace
33	U	82	Total	C	H	N	O	S	0	0
			1315	406	666	128	114	1		

- Molecule 34 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms						AltConf	Trace
34	V	80	Total	C	H	N	O	S	0	0
			1339	411	691	121	113	3		

- Molecule 35 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms						AltConf	Trace
35	W	83	Total	C	H	N	O	S	0	0
			1351	424	688	126	111	2		

- Molecule 36 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms						AltConf	Trace
36	X	116	Total	C	H	N	O	S	0	0
			1864	558	964	181	158	3		

- Molecule 37 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	Y	141	Total	C	N	O	S	0	0
			1032	651	179	196	6		

- Molecule 38 is a protein called 50S ribosomal protein L7/L12.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	Z	30	Total	C	N	O	S	0	0
			227	144	33	47	3		

- Molecule 39 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
39	a	2880	Total	C	H	N	O	P	0	0
			92918	27587	31077	11398	19976	2880		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	887	A	U	conflict	GB 937521852

- Molecule 40 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms						AltConf	Trace
40	b	76	Total	C	H	N	O	S	0	0
			1181	360	599	117	104	1		

- Molecule 41 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms						AltConf	Trace
41	c	77	Total	C	H	N	O	S	0	0
			1277	388	652	129	106	2		

- Molecule 42 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
42	d	120	Total	C	H	N	O	P	0	0
			3870	1144	1301	468	837	120		

- Molecule 43 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms						AltConf	Trace
43	e	62	Total	C	H	N	O	S	0	0
			1032	308	531	98	94	1		

- Molecule 44 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms						AltConf	Trace
44	f	58	Total	C	H	N	O	S	0	0
			936	281	488	87	78	2		

- Molecule 45 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms						AltConf	Trace
45	g	66	Total	C	H	N	O	S	0	0
			1042	323	520	99	94	6		

- Molecule 46 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms						AltConf	Trace
46	h	271	Total	C	H	N	O	S	0	0
			4236	1288	2154	423	364	7		

- Molecule 47 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms						AltConf	Trace
47	i	56	Total	C	H	N	O	S	0	0
			903	269	459	94	80	1		

- Molecule 48 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms						AltConf	Trace
48	j	209	Total	C	H	N	O	S	0	0
			3182	979	1617	288	294	4		

- Molecule 49 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	k	52	Total	C	H	N	O	0	0
			890	275	464	78	73		

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

Mol	Chain	Residues	Atoms						AltConf	Trace
50	l	201	Total	C	H	N	O	S	0	0
			3171	974	1619	283	290	5		

- Molecule 51 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms						AltConf	Trace
51	m	46	Total	C	H	N	O	S	0	0
			795	228	418	90	57	2		

- Molecule 52 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms						AltConf	Trace
52	n	177	Total	C	H	N	O	S	0	0
			2853	899	1443	249	256	6		

- Molecule 53 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms						AltConf	Trace
53	o	64	Total	C	H	N	O	S	0	0
			1076	323	572	105	74	2		

- Molecule 54 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms						AltConf	Trace
54	p	175	Total	C	H	N	O	S	0	0
			2671	826	1358	241	244	2		

- Molecule 55 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms						AltConf	Trace
55	q	38	Total	C	H	N	O	S	0	0
			645	185	343	65	48	4		

- Molecule 56 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms						AltConf	Trace
56	r	149	Total	C	H	N	O	S	0	0
			2259	699	1148	197	214	1		

- Molecule 57 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms						AltConf	Trace
57	s	142	Total	C	H	N	O	S	0	0
			2291	714	1162	212	199	4		

- Molecule 58 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms						AltConf	Trace
58	t	123	Total	C	H	N	O	S	0	0
			1969	593	1023	181	166	6		

- Molecule 59 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms						AltConf	Trace
59	u	144	Total	C	H	N	O	S	0	0
			2182	654	1129	207	190	2		

- Molecule 60 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms						AltConf	Trace
60	v	136	Total	C	H	N	O	S	0	0
			2231	686	1157	205	177	6		

- Molecule 61 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms						AltConf	Trace
61	w	119	Total	C	H	N	O	S	0	0
			1945	588	994	195	163	5		

- Molecule 62 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	x	116	Total	C	H	N	O	0	0
			1815	552	923	178	162		

- Molecule 63 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms						AltConf	Trace
63	y	114	Total	C	H	N	O	S	0	0
			1879	574	962	179	163	1		

- Molecule 64 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
64	z	117	Total	C	H	N	O	0	0
			1967	604	1020	192	151		

- Molecule 65 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
65	7	1	Total	Mg	0
			1	1	

- Molecule 66 is ZINC ION (three-letter code: ZN) (formula: Zn).

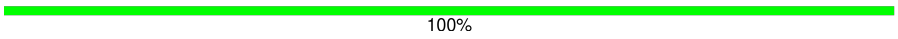
Mol	Chain	Residues	Atoms		AltConf
66	AA	2	Total	Zn	0
			2	2	

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: 50S ribosomal protein L21

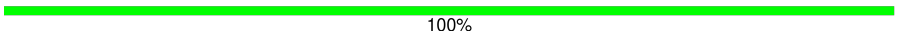
Chain 0:



There are no outlier residues recorded for this chain.

• Molecule 2: 50S ribosomal protein L22

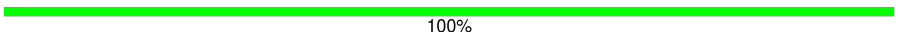
Chain 1:



There are no outlier residues recorded for this chain.

• Molecule 3: 50S ribosomal protein L23

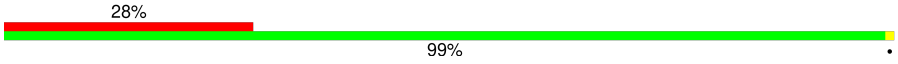
Chain 2:

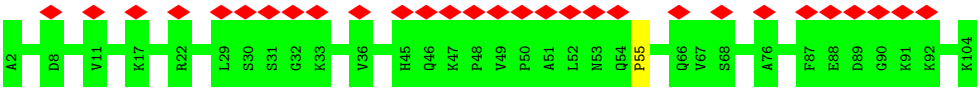


There are no outlier residues recorded for this chain.

• Molecule 4: 50S ribosomal protein L24

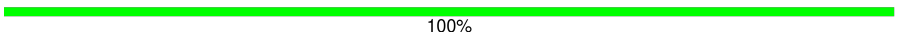
Chain 3:





• Molecule 5: 50S ribosomal protein L25

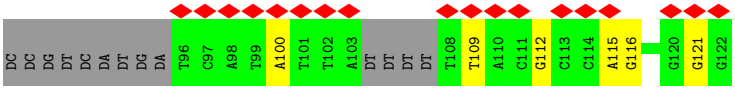
Chain 4:



There are no outlier residues recorded for this chain.

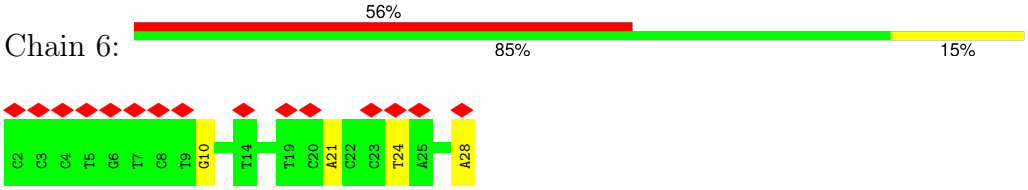
• Molecule 6: NT DNA

Chain 5:



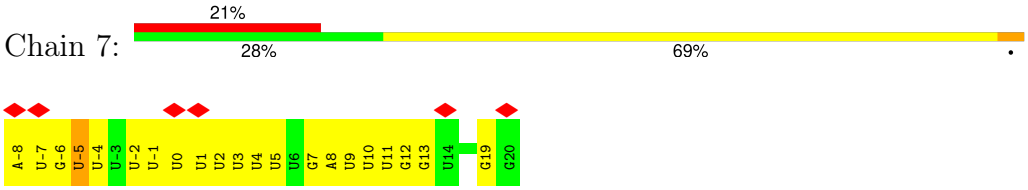
• Molecule 7: T DNA

Chain 6:



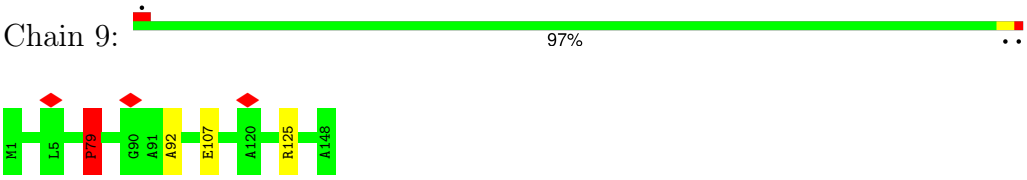
• Molecule 8: mRNA with 12 nt long spacer

Chain 7:



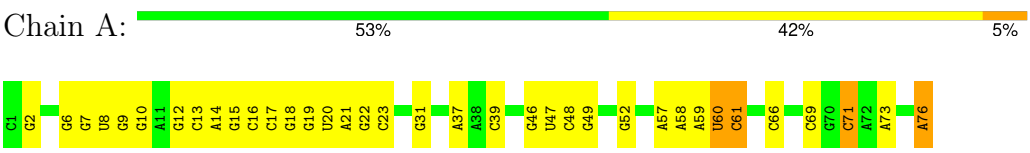
• Molecule 9: 50S ribosomal protein L10

Chain 9:



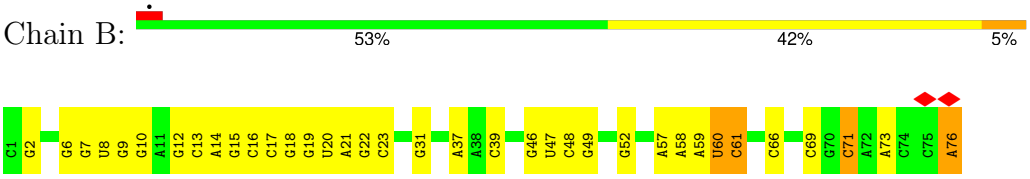
• Molecule 10: E-site and A-site tRNA (fMet)

Chain A:



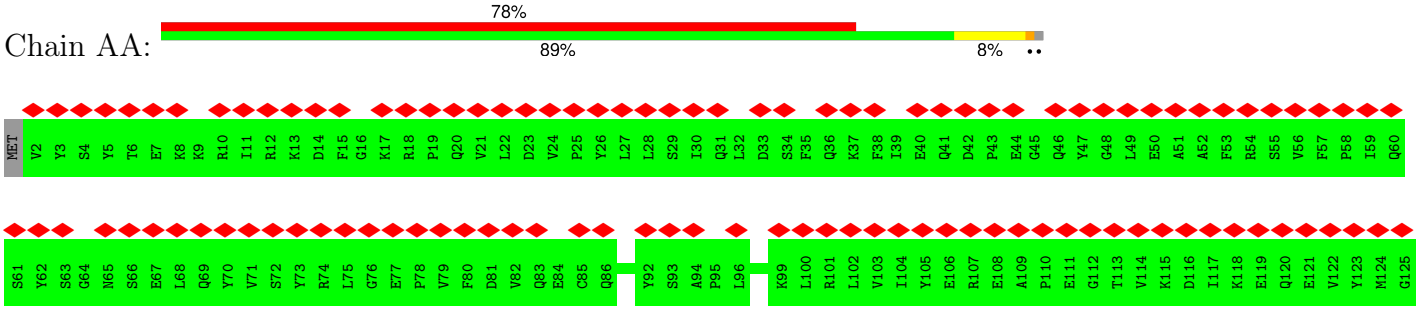
• Molecule 10: E-site and A-site tRNA (fMet)

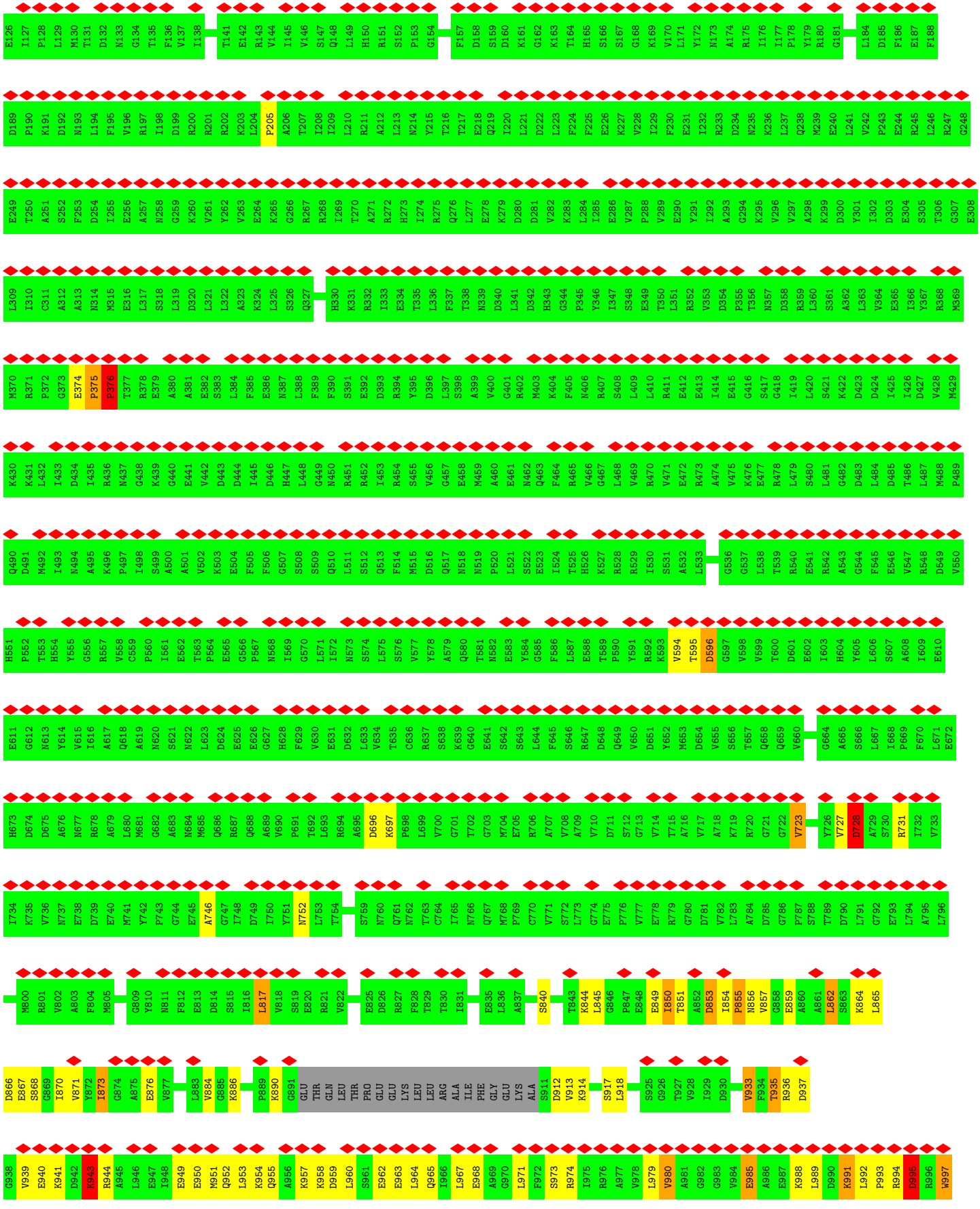
Chain B:

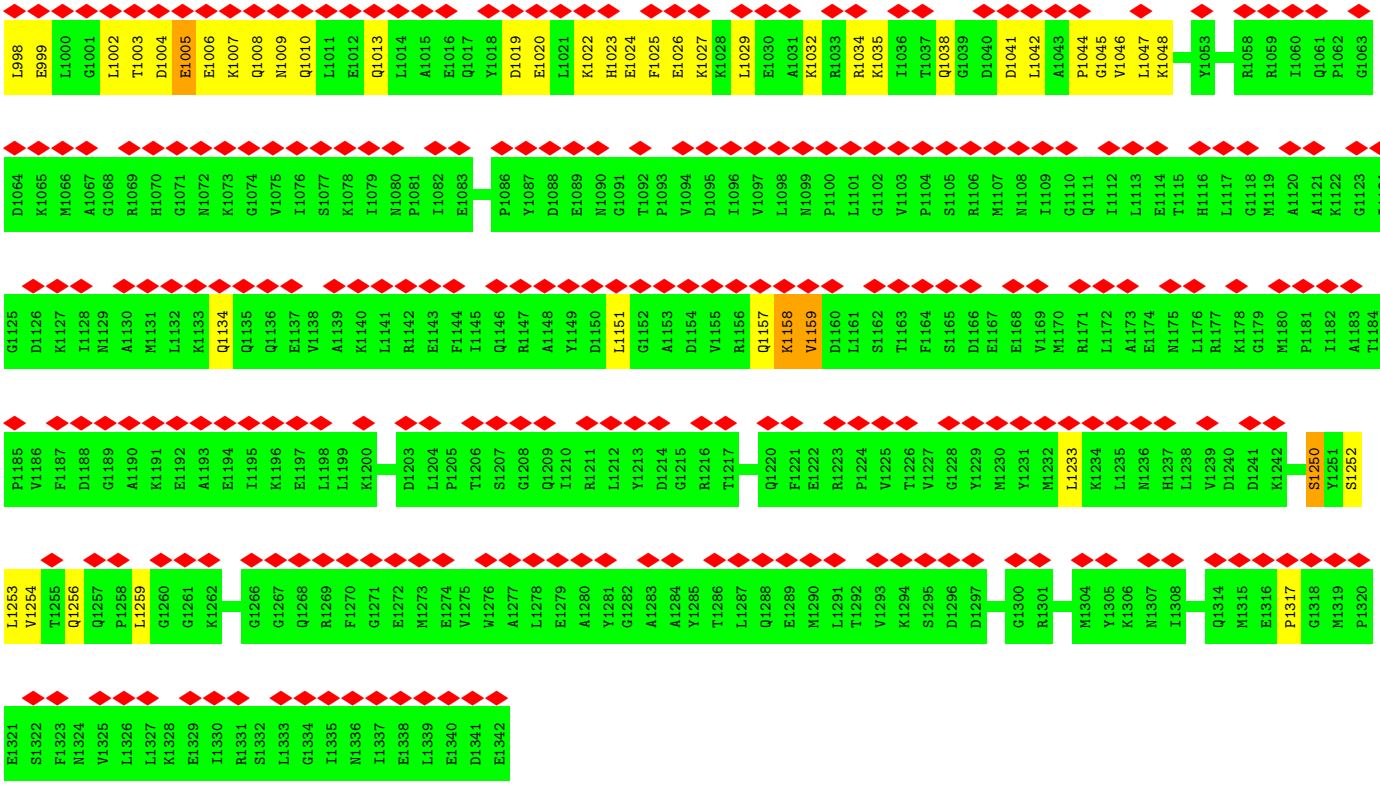


• Molecule 11: DNA-directed RNA polymerase subunit beta

Chain AA:

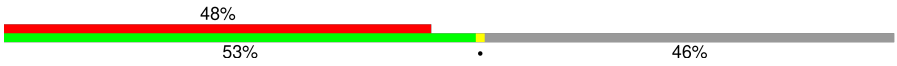


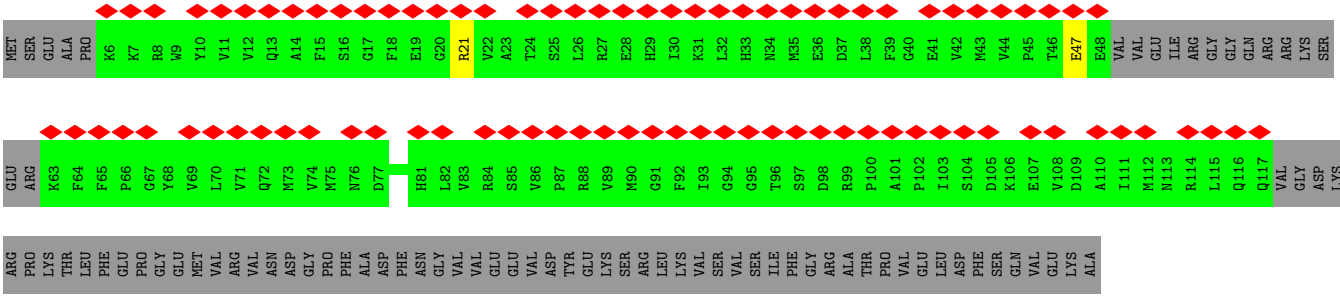

E126 I127 P128 L129 M130 T131 D132 N133 G134 T135 F136 V137 I138
T141 E142 R143 V144 I145 V146 S147 Q148 L149 H150 R151 S152 P153 G154
F157 D158 S159 D160 K161 G162 K163 T164 H165 S166 S167 G168 K169 V170 L171 Y172 N173 A174 R175 I176 I177 P178 Y179 R180 G181
L184 D185 F186 E187 F188
D189 P190 K191 D192 N193 L194 F195 V196 R197 I198 D199 R200 R201 R202 K203 L204
P205
A206 T207 I208 I209 L210 R211 A212 L213 N214 Y215 T216 T217 E218 Q219 I220 L221 D222 L223 F224 F225 E226 K227 V228 I229 F230 E231 I232 R233 D234 N235 K236 L237 Q238 M239 E240 L241 V242 P243 E244 R245 L246 R247 G248
E249 T250 A251 S252 F253 D254 I255 E256 A257 N258 G259 K260 V261 Y262 V263 E264 K265 G266 R267 R268 I269 T270 A271 R272 H273 I274 R275 Q276 L277 E278 K279 D280 D281 V282 K283 L284 I285 E286 V287 P288 V289 E290 Y291 I292 A293 G294 K295 V296 V297 A298 K299 D300 Y301 I302 D303 E304 S305 T306 G307 E308
L309 I310 C311 A312 A313 N314 M315 E316 L317 S318 L319 D320 L321 L322 A323 K324 L325 S326 Q327
H330 K331 R332 I333 E334 T335 L336 F337 T338 N339 D340 L341 D342 H343 G344 P345 Y346 I347 S348 E349 T350 L351 R352 V353 D354 P355 T356 N357 D358 R359 L360 S361 A362 L363 V364 E365 I366 Y367 R368 M369
M370 R371 P372 G373 E374 P375 P376 T377 R378 E379 A380 A381 E382 S383 L384 F385 E386 N387 L388 F389 F390 S391 E392 D393 R394 Y395 D396 L397 S398 A399 V400 G401 R402 M403 K404 F405 N406 R407 S408 L409 L410 R411 E412 E413 I414 E415 G416 S417 G418 I419 L420 S421 K422 D423 D424 I425 I426 D427 V428 M429
K430 K431 L432 I433 D434 I435 R436 N437 G438 K439 G440 E441 V442 D443 D444 I445 D446 H447 L448 G449 N450 R451 R452 R453 I453 R454 S455 V456 G457 E458 M459 A460 E461 N462 Q463 F464 R465 V466 G467 L468 V469 R470 V471 E472 R473 A474 V475 K476 E477 R478 L479 S480 L481 G482 D483 L484 D485 T486 L487 M488 P489
Q490 D491 M492 I493 N494 A495 K496 P497 I498 S499 A500 A501 V502 K503 E504 F505 F506 G507 S508 S509 Q510 L511 S512 Q513 F514 M515 D516 Q517 N518 N519 P520 L521 S522 E523 I524 T525 H526 K527 R528 R529 I530 S531 A532 L533
G536 G537 L538 T539 R540 E541 R542 A543 G544 F545 E546 V547 R548 D549 V550
H551 P552 T553 H554 Y555 G556 R557 V558 C559 P560 I561 E562 T563 P564 E565 G566 P567 N568 I569 G570 L571 I572 N573 S574 L575 S576 V577 Y578 A579 Q580 T581 N582 E583 Y584 G585 F586 L587 E588 T589 P590 Y591 R592 K593
V594 T595 D596
G597 V598 V599 T600 D601 E602 I603 H604 Y605 L606 S607 A608 I609 E610
E611 G612 N613 Y614 V615 I616 A617 Q618 A619 N620 S621 N622 L623 D624 E625 E626 G627 H628 F629 V630 E631 D632 L633 V634 T635 C636 R637 S638 K639 G640 E641 S642 S643 L644 F645 S646 R647 D648 Q649 V650 D651 Y652 M653 D654 V655 S656 T657 Q658 Q659 V660
G664 A665 S666 L667 I668 P669 F670 L671 E672
H673 D674 D675 A676 N677 R678 A679 L680 M681 G682 A683 N684 M685 Q686 R687 Q688 A689 V690 P691 T692 L693 R694 A695
D696 K697
P698 L699 V700 G701 T702 G703 M704 E705 R706 A707 V708 A709 V710 D711 S712 G713 V714 T715 A716 V717 A718 K719 R720 G721 G722 V723
Y726 V727 D728 A729 S730 R731 I732 V733
I734 K735 V736 N737 E738 D739 E740 M741 Y742 P743 G744 E745 A746 G747 I748 D749 I750 Y751 N752 L753 T754
S759 N760 Q761 N762 T763 C764 I765 N766 Q767 M768 P769 C770 V771 S772 L773 G774 E775 P776 V777 E778 R779 G780 D781 V782 L783 A784 D785 G786 P787 S788 T789 D790 L791 G792 E793 L794 A795 L796
M800 R801 V802 A803 F804 M805
G809 Y810 N811 F812 E813 D814 S815 I816 L817 V818 S819 E820 R821 V822
E825 D826 R827 F828 T829 T830 I831
E835 L836 A837
S840
T843 K844 L845 G846 P847 E848 E849 I850 T851 A852 D853 I854 P855 N856 V857 G858 E859 A860 A861 L862 S863 K864 L865
D866 E867 S868 G869 I870 V871 V872 I873 G874 A875 E876 V877
L883 V884 G885 K886
P889 K890 G891 GLU THR GLN LEU THR PRO GLU GLU LYS LEU LEU ARG ALA ILE PHE GLY GLU LYS ALA S911 D912 V913 K914
S917 L918
S925 G926 T927 V928 I929 D930
V933 F934 T935 R936 D937
G938 V939 E940 K941 D942 K943 R944 A945 L946 E947 I948 E949 E950 M951 Q952 L953 K954 Q955 A956 K957 K958 D959 L960 S961 E962 E963 L964 Q965 I966 L967 E968 A969 G970 L971 F972 S973 R974 I975 R976 A977 V978 L979 V980 A981 G982 G983 V984 E985 A986 E987 K988 L989 D990 K991 L992 P993 R994 D995 R996 W997



- Molecule 12: Transcription termination/antitermination protein NusG

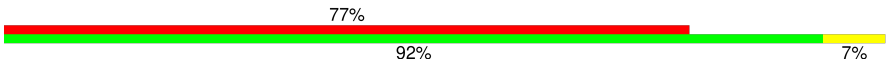
Chain AB:

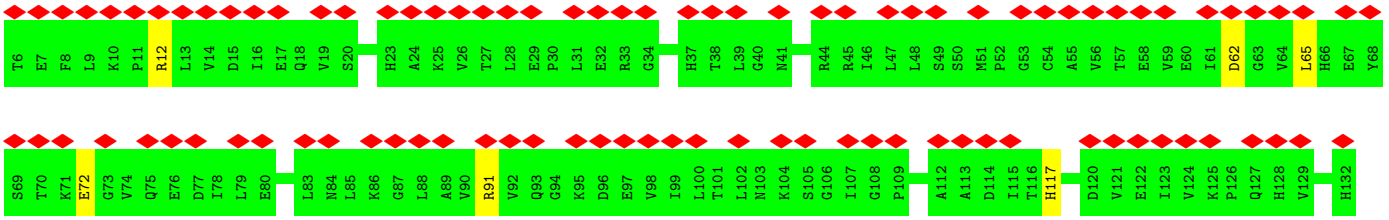


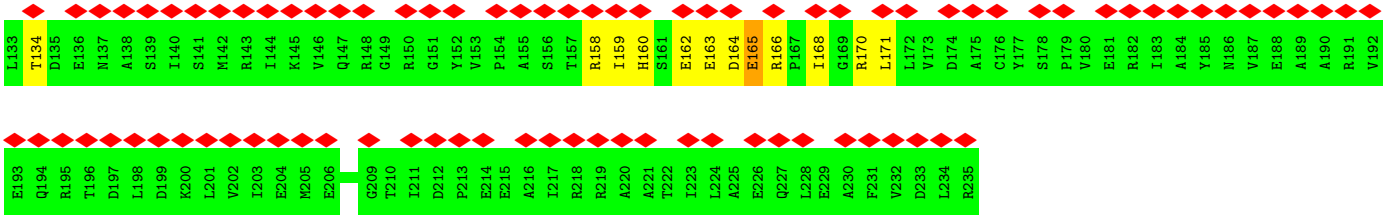


- Molecule 13: DNA-directed RNA polymerase subunit alpha

Chain AC:

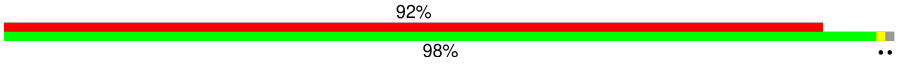


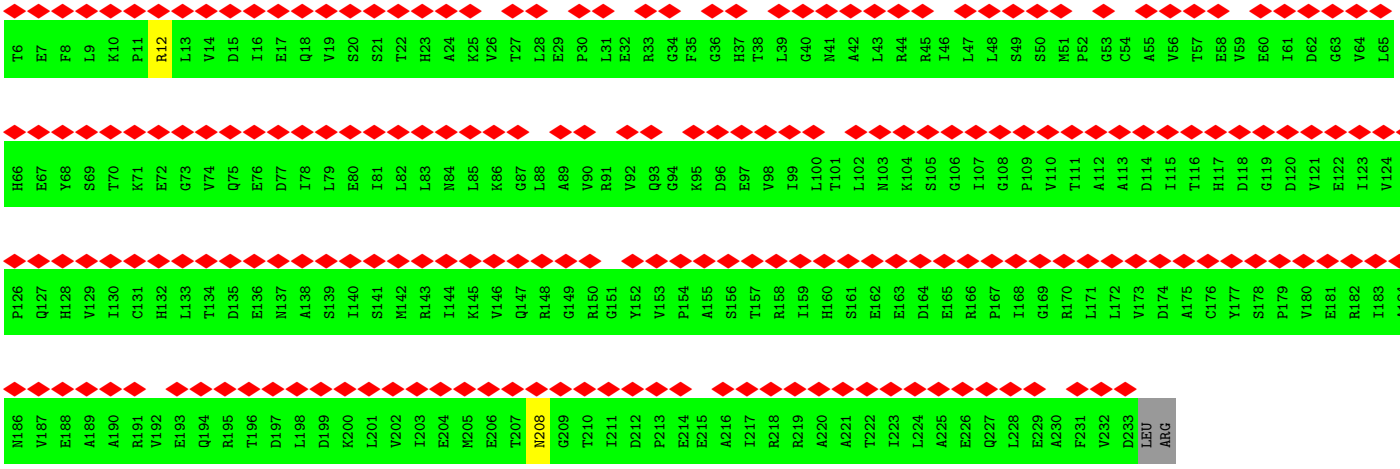




• Molecule 13: DNA-directed RNA polymerase subunit alpha

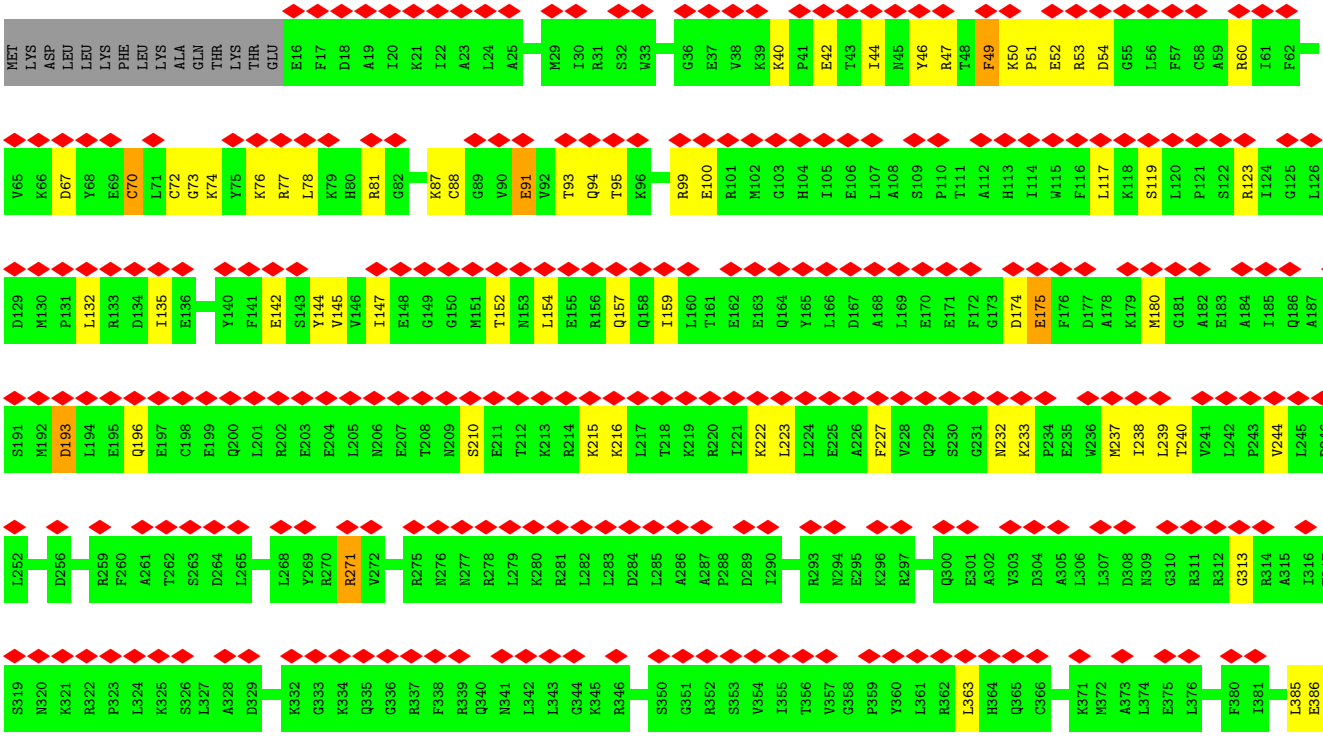
Chain AD:

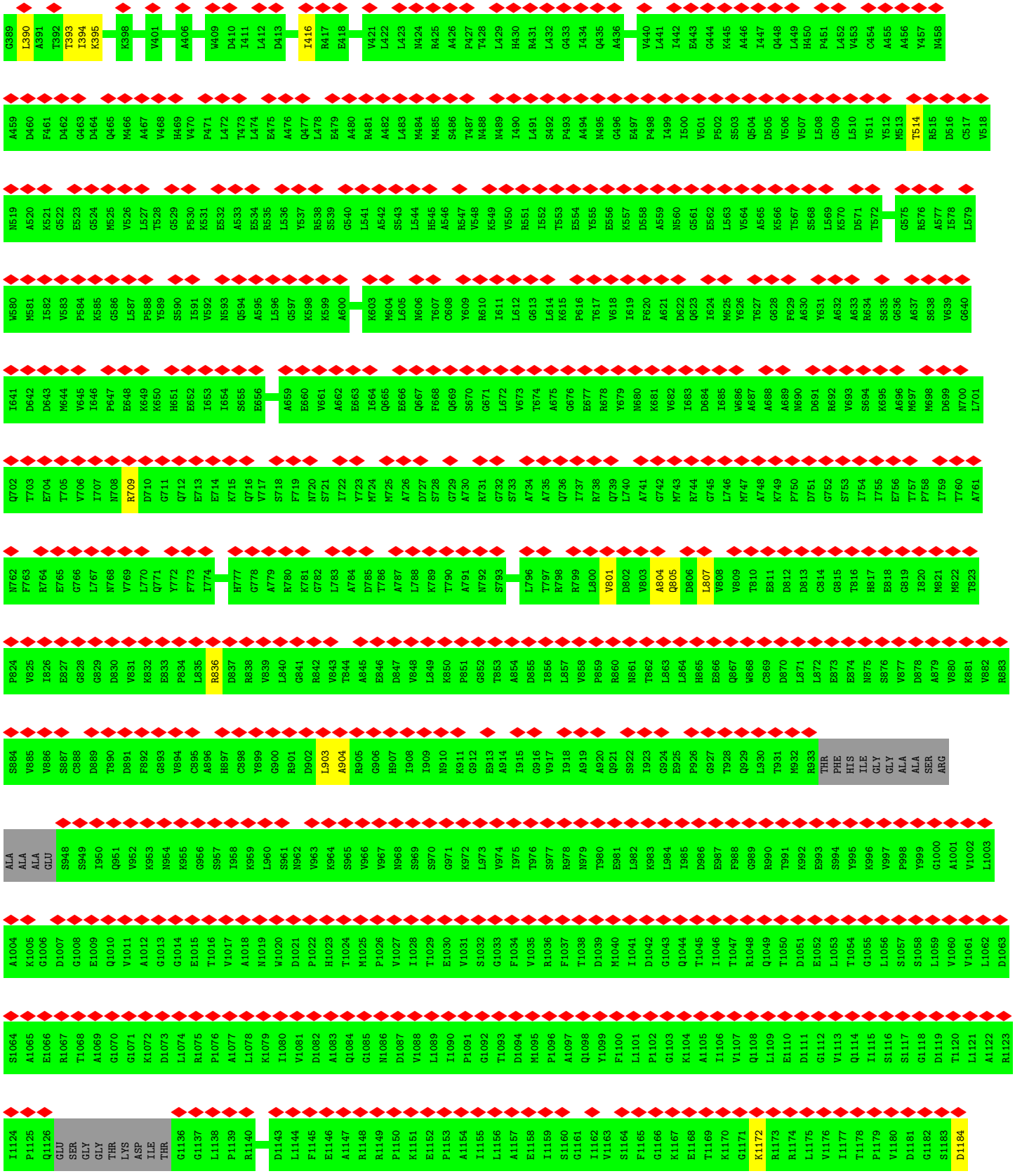


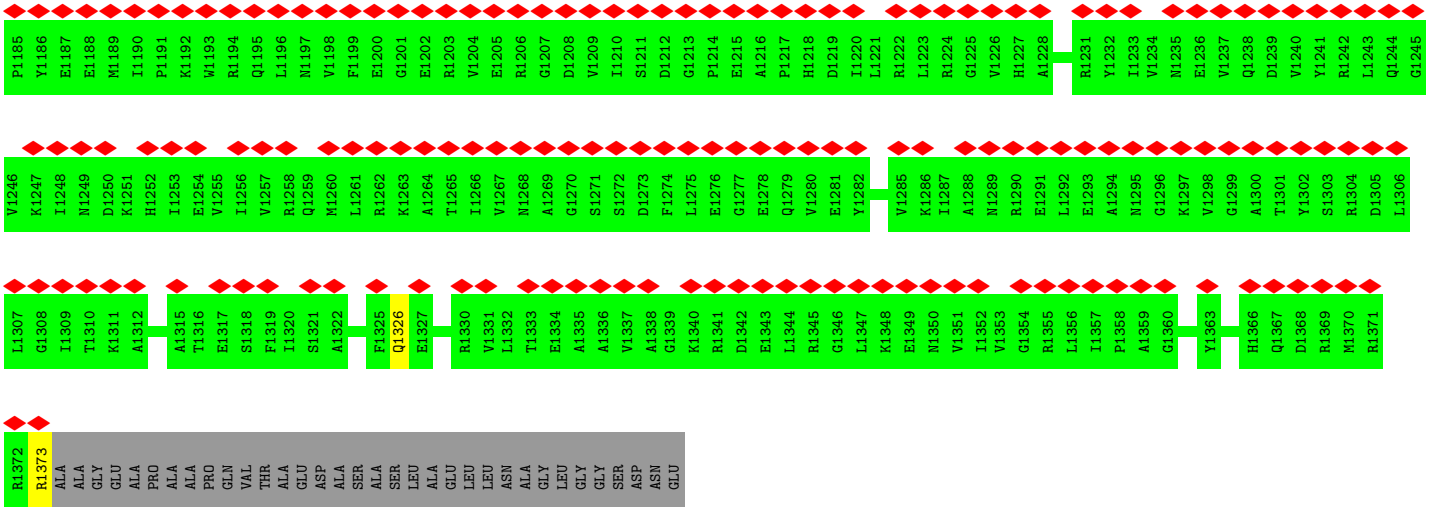


• Molecule 14: DNA-directed RNA polymerase subunit beta'

Chain AE:

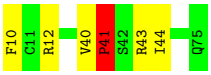



G389 L390 A391 T392 T393 I394 K395 K398 V401 A406 W409 D410 I411 L412 D413 I416 R417 E418 V421 L422 L423 N424 R425 A426 P427 T428 L429 H430 R431 L432 G433 I434 Q435 A436 V440 L441 I442 E443 G444 K445 A446 I447 Q448 L449 H450 P451 L452 V453 C454 A455 A456 Y457 N458
A459 D460 F461 D462 G463 D464 Q465 M466 A467 V468 H469 V470 P471 L472 T473 L474 E475 A476 Q477 L478 E479 A480 R481 A482 L483 M484 M485 S486 T487 N488 N489 I490 L491 S492 P493 A494 N495 G496 E497 P498 I499 I500 V501 P502 S503 Q504 D505 V506 V507 L508 G509 L510 Y511 V512 M513 T514 R515 D516 C517 V518
N519 A520 K521 G522 E523 G524 M525 V526 L527 T528 G529 P530 K531 E532 A533 E534 R535 L536 Y537 R538 S539 G540 L541 A542 S543 L544 H545 A546 R547 V548 K549 V550 R551 I552 T553 E554 Y555 E556 K557 D558 A559 N560 G561 E562 L563 V564 A565 K566 T567 S568 L569 K570 D571 T572 G575 R576 A577 I578 L579
W580 M581 I582 V583 P584 K585 G586 L587 P588 Y589 S590 I591 V592 N593 Q594 A595 L596 G597 K598 K599 A600 K603 M604 L605 N606 T607 C608 Y609 R610 I611 L612 G613 L614 K615 P616 T617 V618 I619 F620 A621 D622 Q623 I624 M625 Y626 T627 G628 F629 A630 Y631 A632 A633 R634 S635 G636 A637 S638 V639 G640
I641 D642 D643 M644 V645 I646 P647 E648 K649 K650 H651 E652 I653 I654 S655 E656 A659 E660 V661 A662 E663 I664 Q665 E666 Q667 F668 Q669 S670 G671 L672 V673 T674 A675 G676 E677 R678 Y679 N680 K681 V682 I683 D684 I685 W686 A687 A688 A689 N690 D691 R692 V693 S694 K695 A696 M697 M698 D699 N700 L701
Q702 T703 E704 T705 V706 I707 N708 R709 D710 G711 Q712 E713 E714 K715 Q716 V717 S718 F719 N720 S721 I722 Y723 M724 M725 A726 D727 S728 G729 A730 R731 G732 S733 A734 A735 Q736 I737 R738 Q739 L740 A741 G742 M743 R744 G745 L746 M747 A748 K749 P750 D751 G752 S753 I754 I755 E756 T757 P758 I759 T760 A761
N762 F763 R764 E765 G766 L767 N768 V769 L770 Q771 Y772 F773 I774 H777 G778 A779 R780 K781 G782 L783 A784 D785 T786 A787 L788 K789 T790 A791 N792 S793 L796 T797 R798 R799 L800 V801 D802 V803 A804 Q805 D806 L807 V808 V809 T810 E811 D812 D813 C814 G815 T816 H817 E818 G819 I820 M821 M822 T823
P824 V825 I826 E827 G828 G829 D830 V831 K832 E833 P834 L835 R836 D837 R838 V839 L840 G841 R842 V843 T844 A845 E846 D847 V848 L849 K850 P851 G852 T853 A854 D855 I856 L857 V858 P859 R860 N861 T862 L863 L864 H865 E866 Q867 W868 C869 D870 L871 L872 E873 E874 N875 S876 V877 D878 A879 V880 K881 V882 R883
S884 V885 V886 S887 C888 D889 T890 D891 F892 G893 V894 C895 A896 H897 C898 Y899 G900 R901 D902 L903 A904 R905 G906 H907 I908 I909 N910 K911 G912 E913 A914 I915 G916 V917 I918 A919 A920 Q921 S922 I923 G924 E925 P926 G927 T928 Q929 L930 T931 M932 R933 THR PHE HIS ILE GLY GLY ALA ALA SER ARG
ALA ALA ALA GLU S948 S949 I950 Q951 V952 K953 N954 K955 G956 S957 I958 K959 L960 S961 N962 V963 K964 S965 V966 V967 N968 H969 I970 G971 K972 L973 V974 I975 T976 S977 R978 N979 T980 E981 L982 K983 L984 I985 D986 E987 F988 G989 R990 T991 K992 E993 S994 Y995 K996 V997 P998 Y999 G1000 A1001 V1002 L1003
A1004 K1005 G1006 D1007 G1008 E1009 Q1010 V1011 A1012 G1013 G1014 E1015 T1016 V1017 A1018 N1019 W1020 D1021 P1022 H1023 T1024 M1025 P1026 V1027 I1028 T1029 E1030 V1031 S1032 G1033 F1034 V1035 R1036 F1037 T1038 D1039 M1040 I1041 D1042 G1043 Q1044 T1045 I1046 T1047 R1048 Q1049 T1050 D1051 E1052 L1053 T1054 G1055 L1056 S1057 S1058 L1059 V1060 V1061 L1062 D1063
S1064 A1065 E1066 R1067 T1068 A1069 G1070 G1071 K1072 D1073 L1074 R1075 P1076 A1077 L1078 K1079 I1080 V1081 D1082 A1083 Q1084 G1085 N1086 D1087 V1088 L1089 I1090 P1091 G1092 T1093 D1094 M1095 P1096 A1097 Q1098 Y1099 F1100 L1101 P1102 G1103 K1104 A1105 I1106 V1107 Q1108 L1109 E1110 D1111 G1112 V1113 Q1114 I1115 S1116 S1117 G1118 D1119 T1120 L1121 A1122 R1123
I1124 P1125 Q1126 GLU SER GLY GLY THR LYS ASP ILE THR G1136 G1137 L1138 P1139 R1140 D1143 L1144 F1145 E1146 A1147 R1148 R1149 P1150 K1151 E1152 P1153 A1154 I1155 L1156 A1157 E1158 I1159 S1160 G1161 I1162 V1163 S1164 F1165 G1166 K1167 E1168 T1169 K1170 G1171 K1172 R1173 R1174 L1175 V1176 I1177 T1178 P1179 V1180 D1181 G1182 S1183 D1184



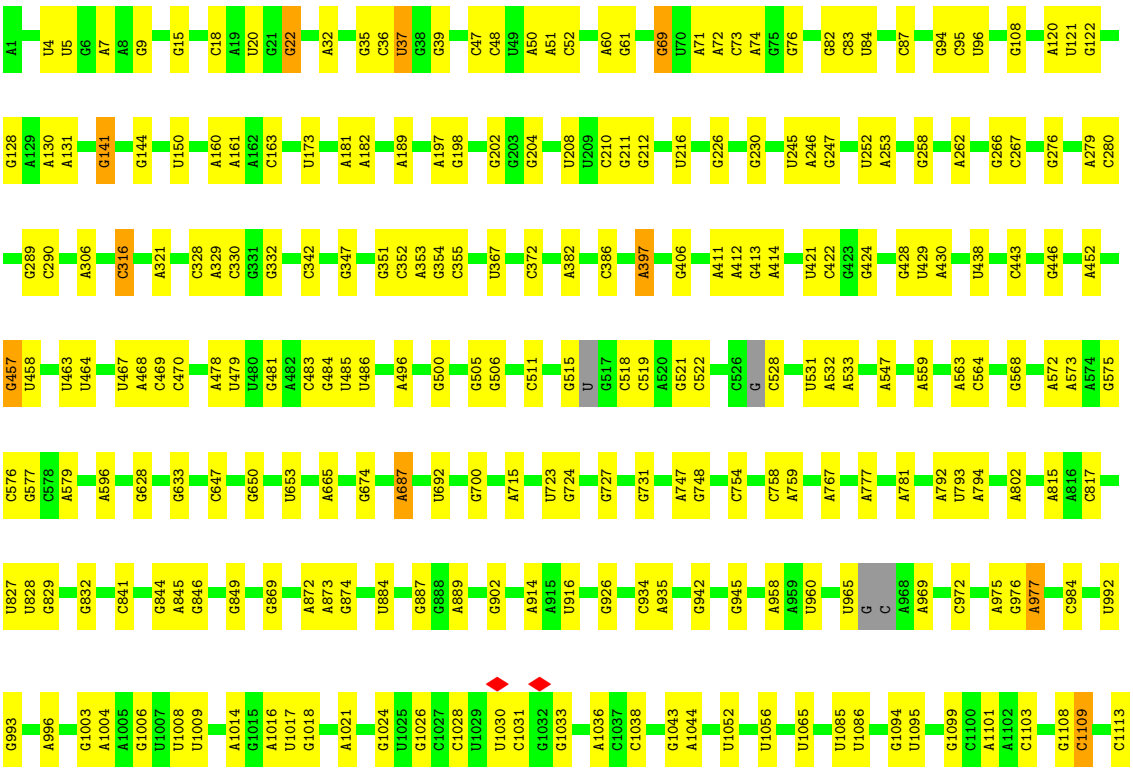
• Molecule 15: 30S ribosomal protein S18

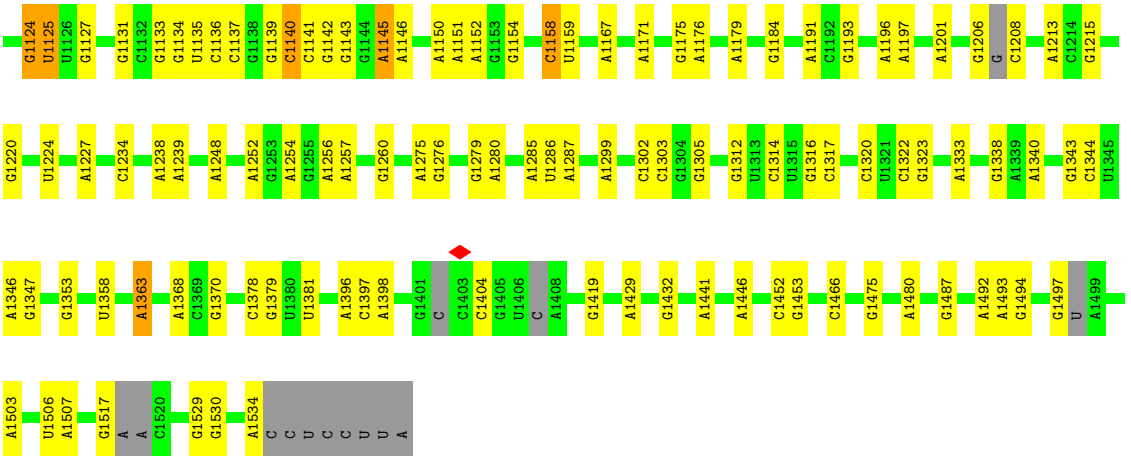
Chain C:



• Molecule 16: 16S rRNA

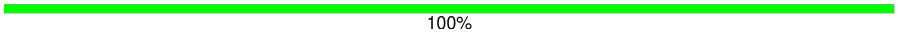
Chain D:





• Molecule 17: 30S ribosomal protein S20

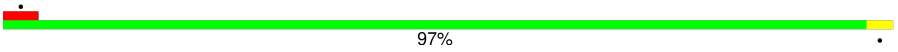
Chain E:

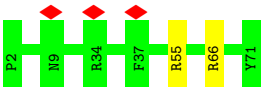


There are no outlier residues recorded for this chain.

• Molecule 18: 30S ribosomal protein S21

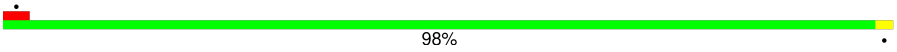
Chain F:

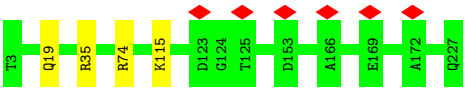




• Molecule 19: 30S ribosomal protein S2

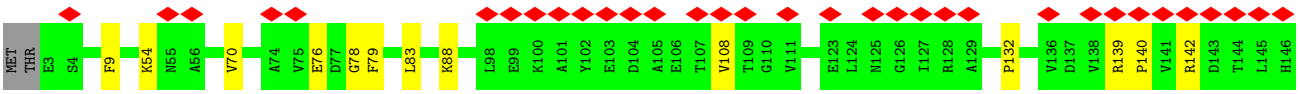
Chain G:

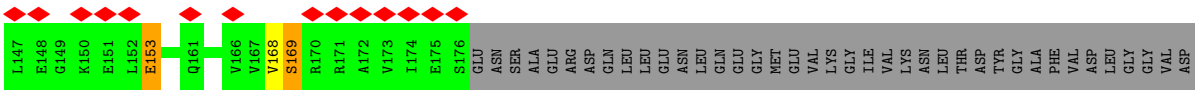


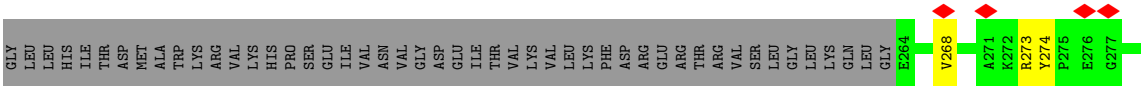


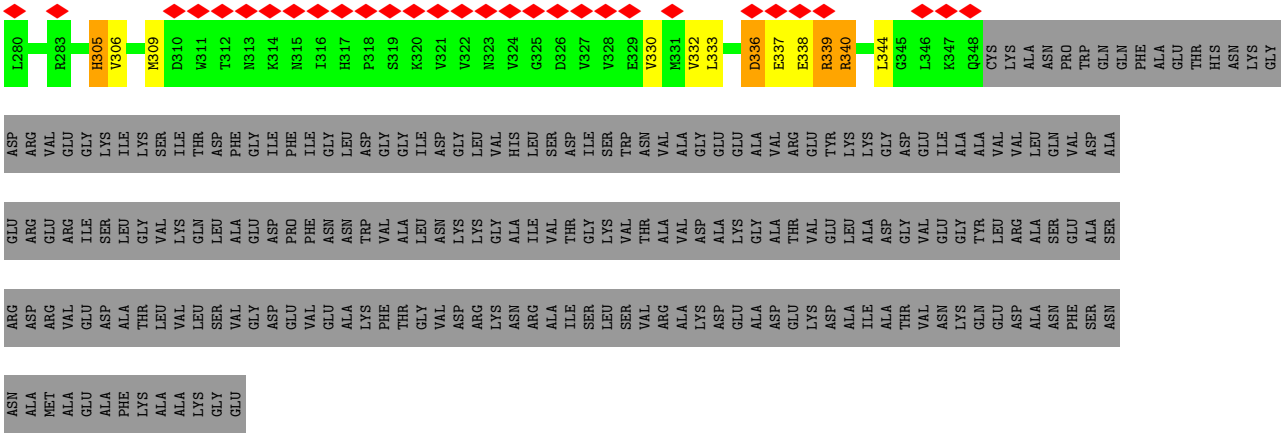
• Molecule 20: 30S ribosomal protein S1

Chain H:



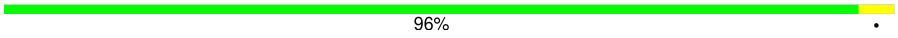






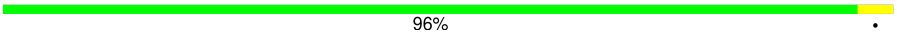
• Molecule 21: 30S ribosomal protein S3

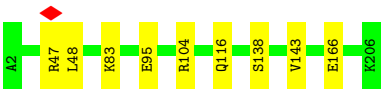
Chain I:



• Molecule 22: 30S ribosomal protein S4

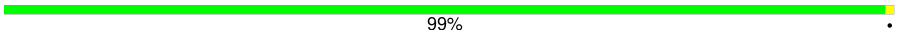
Chain J:





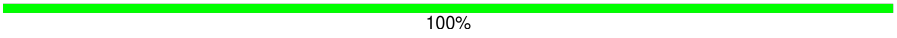
• Molecule 23: 30S ribosomal protein S5

Chain K:



• Molecule 24: 30S ribosomal protein S6

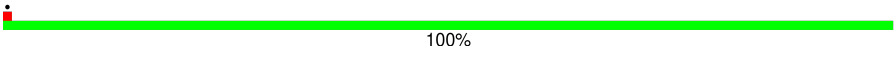
Chain L:



There are no outlier residues recorded for this chain.

• Molecule 25: 30S ribosomal protein S7

Chain M:



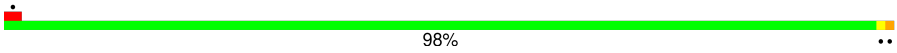
• Molecule 26: 30S ribosomal protein S8

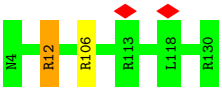
Chain N:

There are no outlier residues recorded for this chain.

• Molecule 27: 30S ribosomal protein S9

Chain O:



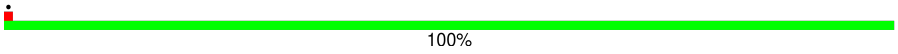


• Molecule 28: 30S ribosomal protein S10

Chain P:

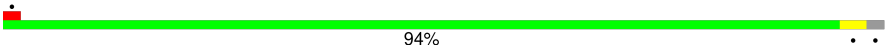
• Molecule 29: 30S ribosomal protein S11

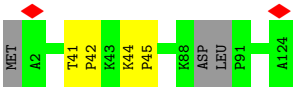
Chain Q:



• Molecule 30: 30S ribosomal protein S12

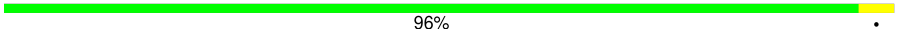
Chain R:

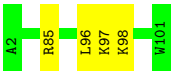




• Molecule 31: 30S ribosomal protein S14

Chain S:





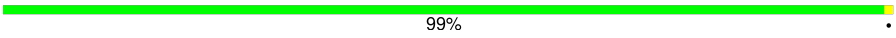
• Molecule 32: 30S ribosomal protein S15

Chain T:

There are no outlier residues recorded for this chain.

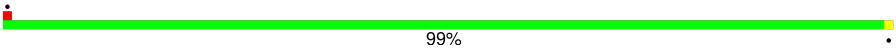
• Molecule 33: 30S ribosomal protein S16

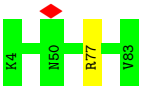
Chain U:



• Molecule 34: 30S ribosomal protein S17

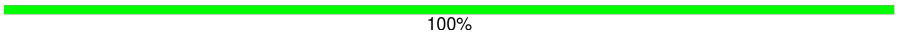
Chain V:





• Molecule 35: 30S ribosomal protein S19

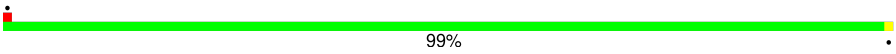
Chain W:

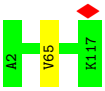


There are no outlier residues recorded for this chain.

• Molecule 36: 30S ribosomal protein S13

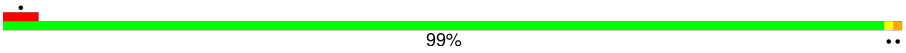
Chain X:





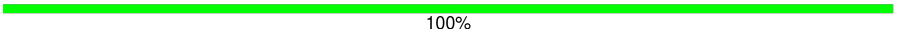
• Molecule 37: 50S ribosomal protein L11

Chain Y:



• Molecule 38: 50S ribosomal protein L7/L12

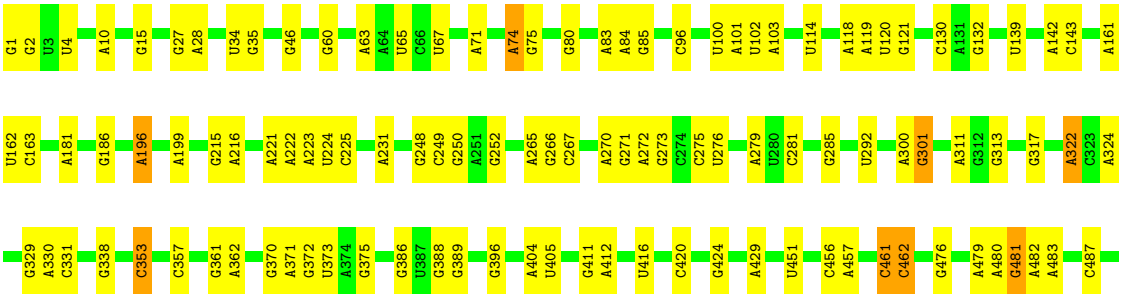
Chain Z:

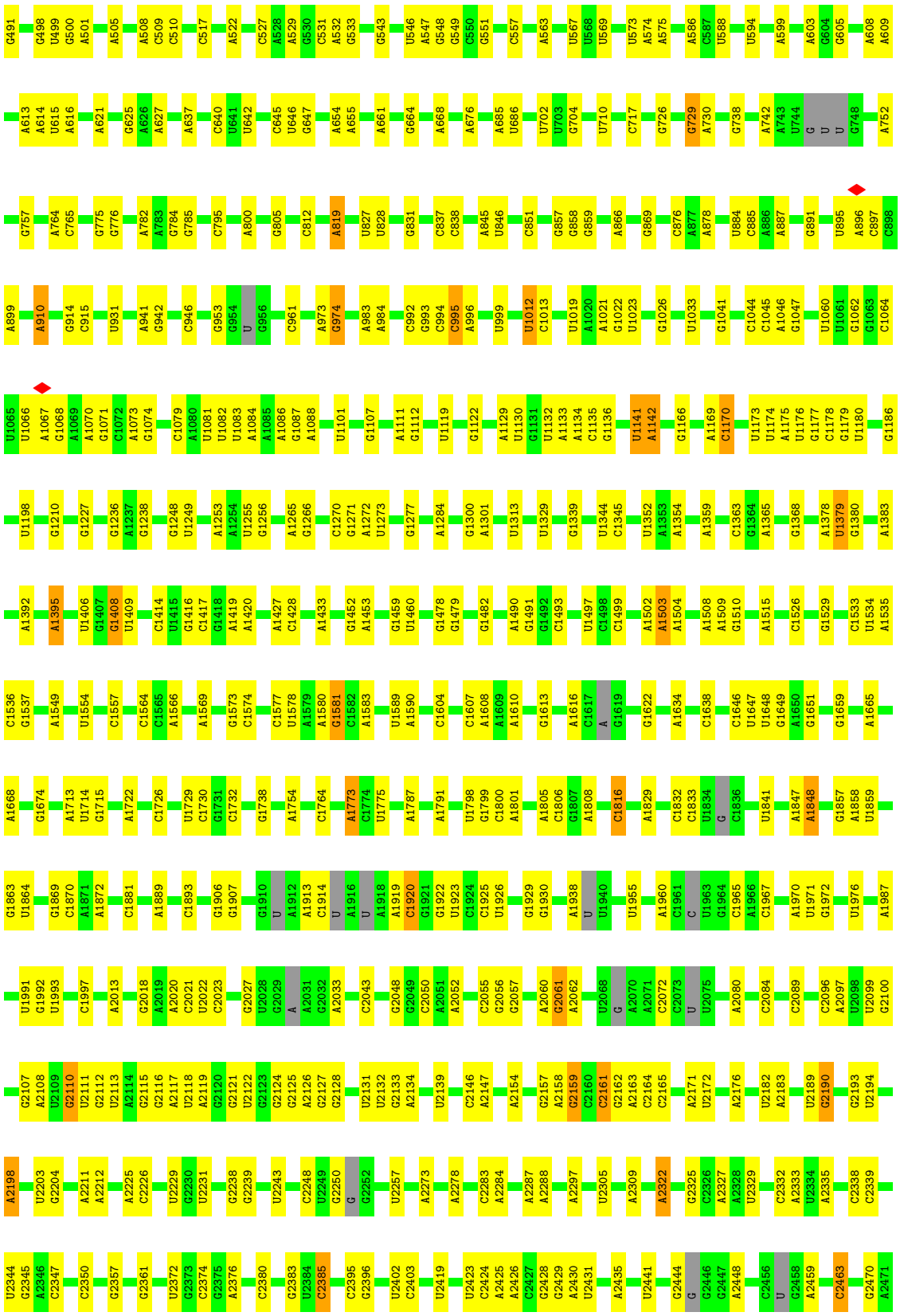


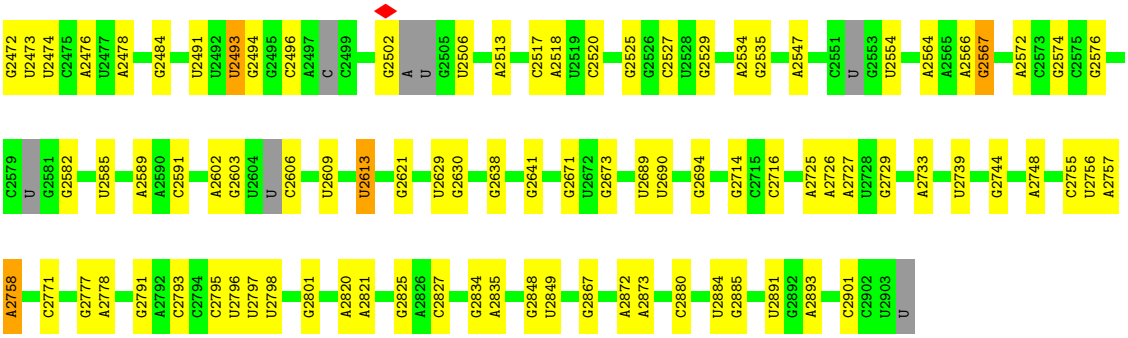
There are no outlier residues recorded for this chain.

• Molecule 39: 23S rRNA

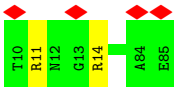
Chain a:




G491 G498 U499 G500 A501 A505 A508 C509 C510 C517 A522 C527 A528 A529 G530 C531 A532 G533 G543 U546 A547 G548 G549 C550 G551 C557 A563 U567 U568 U569 U573 A574 A575 A586 C587 U588 U594 A599 A603 G604 G605 A608 A609
A613 A614 U615 A616 A621 G625 A626 A627 A637 C640 U641 U642 C645 U646 G647 A654 A655 A661 G664 A668 A676 A685 U686 U702 U703 G704 U710 C717 G726 G729 A730 G738 A742 A743 U744 G U U G748 A752
G757 A764 C765 G775 G776 A782 A783 G784 G785 C795 A800 G805 C812 A819 U827 U828 G831 C837 C838 A845 U846 C851 G857 G858 G859 A866 G869 C876 A877 A878 U884 C885 A886 A887 G891 U895 A896 C897 C898
A899 A910 G914 C915 U931 A941 G942 C946 G953 G954 U G956 C961 A973 G974 A983 A984 C992 G993 C994 C995 A996 U999 U1012 C1013 U1019 A1020 A1021 G1022 U1023 G1026 U1033 G1041 C1044 C1045 A1046 G1047 U1060 U1061 G1062 G1063 C1064
U1065 U1066 A1067 G1068 A1069 A1070 G1071 C1072 A1073 G1074 C1079 A1080 U1081 U1082 U1083 A1084 A1085 A1086 G1087 A1088 U1101 G1107 A1111 G1112 U1119 G1122 A1129 U1130 G1131 U1132 A1133 A1134 C1135 G1136 U1141 A1142 G1166 A1169 C1170 U1173 U1174 A1175 U1176 G1177 C1178 G1179 U1180 G1186
U1198 G1210 G1227 G1236 A1237 G1238 G1248 U1249 A1253 A1254 U1255 G1256 A1265 G1266 C1270 G1271 A1272 U1273 G1277 A1284 G1300 A1301 U1313 U1329 G1339 U1344 C1345 U1352 A1353 A1354 A1359 C1363 G1364 A1365 G1368 A1378 U1379 G1380 A1383
A1392 A1395 U1406 G1407 G1408 U1409 C1414 U1415 G1416 C1417 G1418 A1419 A1420 A1427 C1428 A1433 G1452 A1453 G1459 U1460 G1478 G1479 G1482 A1490 G1491 G1492 C1493 U1497 C1498 C1499 A1502 A1503 A1504 A1508 A1509 G1510 A1515 C1526 G1529 C1533 U1534 A1535
C1536 G1537 A1549 U1554 C1557 C1564 C1565 A1566 A1569 G1573 C1574 C1577 U1578 A1579 A1580 G1581 C1582 A1583 U1589 A1590 C1604 C1607 A1608 A1609 A1610 G1613 A1616 C1617 A G1619 G1622 A1634 C1638 C1646 U1647 U1648 G1649 A1650 G1651 G1659 A1665
A1668 G1674 A1713 U1714 G1715 A1722 C1726 U1729 C1730 G1731 C1732 G1738 A1754 C1764 A1773 C1774 U1775 A1787 A1791 U1798 G1799 C1800 A1801 A1805 C1806 G1807 A1808 C1816 A1829 C1832 C1833 U1834 G C1836 U1841 A1847 A1848 G1857 A1858 U1859
G1863 U1864 G1869 C1870 A1871 A1872 C1881 A1889 C1893 G1906 G1907 G1910 U A1912 A1913 C1914 U A1916 U A1918 A1919 C1920 G1921 G1922 U1923 C1924 C1925 U1926 G1929 G1930 A1938 U A1940 U1955 A1960 C1961 C U1963 G1964 C1965 A1966 C1967 A1970 U1971 G1972 U1976 A1987
U1991 G1992 U1993 C1997 A2013 G2018 A2019 A2020 C2021 U2022 C2023 G2027 U2028 G2029 A A2031 G2032 A2033 C2043 G2048 G2049 C2050 A2051 A2052 C2055 G2056 G2057 A2060 G2061 A2062 U2068 G A2070 A2071 C2072 C2073 U U2075 A2080 C2084 C2089 C2096 A2097 U2098 U2099 G2100
G2107 A2108 U2109 G2110 U2111 G2112 U2113 A2114 G2115 G2116 A2117 U2118 A2119 G2120 G2121 U2122 G2123 G2124 G2125 A2126 G2127 G2128 U2131 U2132 G2133 A2134 U2139 C2146 A2147 A2154 G2157 A2158 G2159 C2160 C2161 G2162 A2163 C2164 C2165 A2171 U2172 A2176 U2182 A2183 U2189 G2190 G2193 U2194
A2198 U2203 G2204 A2211 A2212 A2225 C2226 U2229 G2230 U2231 G2238 G2239 U2243 C2248 U2249 G2250 G G2252 U2257 A2273 A2278 C2283 A2284 A2287 A2288 A2297 U2305 A2309 A2322 G2325 C2326 A2327 A2328 U2329 C2332 A2333 U2334 A2335 C2338 C2339
U2344 G2345 A2346 C2347 C2350 G2357 G2361 U2372 G2373 C2374 G2375 A2376 C2380 G2383 U2384 C2385 C2395 G2396 U2402 C2403 U2419 U2423 C2424 A2425 A2426 C2427 G2428 G2429 A2430 U2431 A2435 U2441 G2444 G C2446 G2447 A2448 C2456 U C2458 A2459 C2463 G2470 A2471



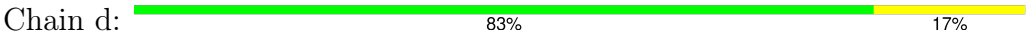
• Molecule 40: 50S ribosomal protein L27

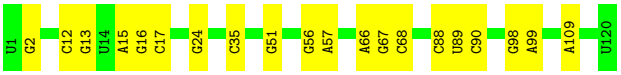


• Molecule 41: 50S ribosomal protein L28

There are no outlier residues recorded for this chain.

• Molecule 42: 5S rRNA





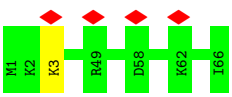
• Molecule 43: 50S ribosomal protein L29

There are no outlier residues recorded for this chain.

• Molecule 44: 50S ribosomal protein L30

There are no outlier residues recorded for this chain.

• Molecule 45: 50S ribosomal protein L31

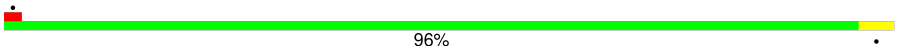


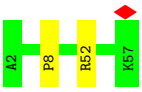
• Molecule 46: 50S ribosomal protein L2

Chain h:

• Molecule 47: 50S ribosomal protein L32

Chain i:



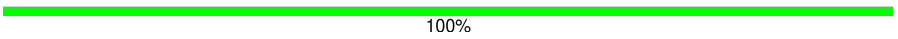


• Molecule 48: 50S ribosomal protein L3

Chain j:

• Molecule 49: 50S ribosomal protein L33

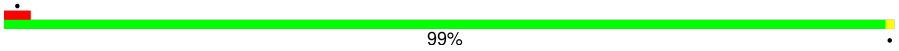
Chain k:

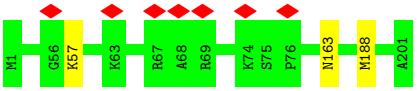


There are no outlier residues recorded for this chain.

• Molecule 50: 50S ribosomal protein L4

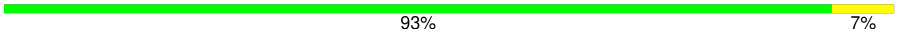
Chain l:

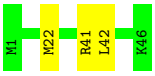




• Molecule 51: 50S ribosomal protein L34

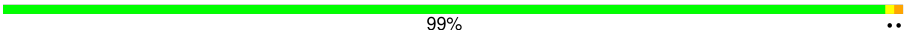
Chain m:





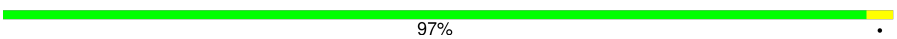
• Molecule 52: 50S ribosomal protein L5

Chain n:



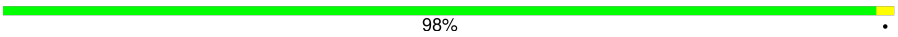
• Molecule 53: 50S ribosomal protein L35

Chain o:



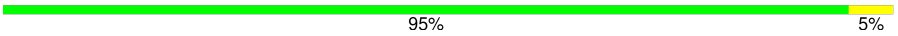
• Molecule 54: 50S ribosomal protein L6

Chain p:



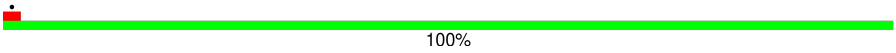
• Molecule 55: 50S ribosomal protein L36

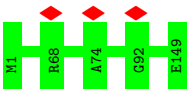
Chain q:



• Molecule 56: 50S ribosomal protein L9

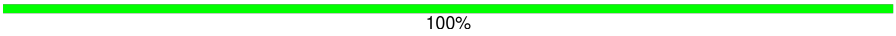
Chain r:





• Molecule 57: 50S ribosomal protein L13

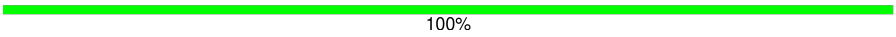
Chain s:



There are no outlier residues recorded for this chain.

• Molecule 58: 50S ribosomal protein L14

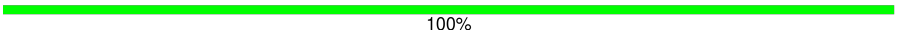
Chain t:



There are no outlier residues recorded for this chain.

• Molecule 59: 50S ribosomal protein L15

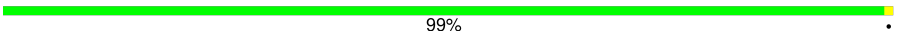
Chain u:

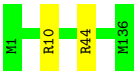


There are no outlier residues recorded for this chain.

• Molecule 60: 50S ribosomal protein L16

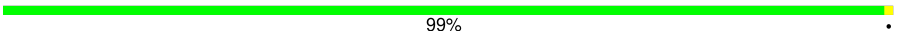
Chain v:





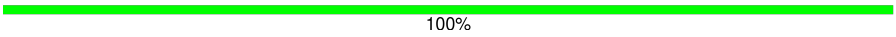
• Molecule 61: 50S ribosomal protein L17

Chain w:



• Molecule 62: 50S ribosomal protein L18

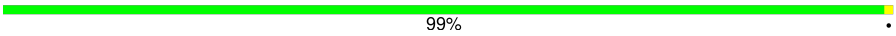
Chain x:



There are no outlier residues recorded for this chain.

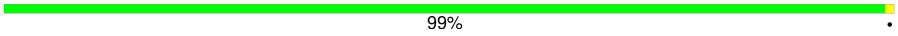
• Molecule 63: 50S ribosomal protein L19

Chain y:



• Molecule 64: 50S ribosomal protein L20

Chain z:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	24959	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 ($e^-/Å^2$)	45	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.093	Depositor
Minimum map value	-0.039	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.007	Depositor
Map size (Å)	548.05, 548.05, 548.05	wwPDB
Map dimensions	500, 500, 500	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.0961, 1.0961, 1.0961	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, 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	0	0.51	0/829	0.70	0/1107
2	1	0.48	0/864	0.62	0/1156
3	2	0.48	0/752	0.63	0/1005
4	3	0.46	0/796	0.65	0/1062
5	4	0.47	0/766	0.60	0/1025
6	5	1.13	6/528 (1.1%)	0.97	1/810 (0.1%)
7	6	1.11	4/603 (0.7%)	0.97	0/926
8	7	0.60	2/681 (0.3%)	0.92	3/1058 (0.3%)
9	9	0.34	0/1131	0.63	1/1524 (0.1%)
10	A	0.55	0/1810	1.28	11/2821 (0.4%)
10	B	0.55	0/1810	1.28	11/2821 (0.4%)
11	AA	0.58	2/10591 (0.0%)	0.75	15/14289 (0.1%)
12	AB	0.43	0/808	0.59	0/1088
13	AC	0.48	0/1808	0.62	1/2450 (0.0%)
13	AD	0.39	0/1789	0.56	0/2425
14	AE	0.50	3/10545 (0.0%)	0.66	4/14236 (0.0%)
15	C	0.88	3/553 (0.5%)	0.86	2/743 (0.3%)
16	D	0.69	9/36610 (0.0%)	1.21	107/57091 (0.2%)
17	E	0.50	0/675	0.64	0/895
18	F	0.53	0/597	0.63	0/792
19	G	0.47	0/1791	0.61	0/2413
20	H	0.57	1/1746 (0.1%)	1.05	13/2382 (0.5%)
21	I	0.44	0/1663	0.71	0/2241
22	J	0.48	0/1665	0.74	0/2227
23	K	0.52	0/1165	0.67	0/1568
24	L	0.54	0/867	0.70	0/1171
25	M	0.51	0/1195	0.63	0/1602
26	N	0.50	0/989	0.68	0/1326
27	O	0.59	0/1034	0.78	0/1375
28	P	0.44	0/800	0.77	0/1082
29	Q	0.47	0/893	0.65	0/1205
30	R	0.72	2/952 (0.2%)	0.80	1/1274 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
31	S	0.48	0/817	0.69	0/1088
32	T	0.47	0/722	0.62	0/964
33	U	0.58	2/659 (0.3%)	0.67	0/884
34	V	0.50	0/657	0.64	0/881
35	W	0.46	0/680	0.62	0/915
36	X	0.43	0/909	0.59	0/1215
37	Y	0.37	0/1046	0.59	2/1410 (0.1%)
38	Z	0.28	0/227	0.47	0/304
39	a	0.69	12/69247 (0.0%)	1.19	226/107985 (0.2%)
40	b	0.49	0/589	0.59	0/779
41	c	0.47	0/635	0.67	0/848
42	d	0.67	0/2872	1.10	2/4478 (0.0%)
43	e	0.44	0/502	0.59	0/667
44	f	0.43	0/452	0.66	0/605
45	g	0.44	0/531	0.62	0/709
46	h	0.61	2/2121 (0.1%)	0.76	4/2852 (0.1%)
47	i	0.65	1/450 (0.2%)	0.86	2/599 (0.3%)
48	j	0.50	0/1586	0.67	0/2134
49	k	0.51	0/433	0.60	0/576
50	l	0.47	0/1571	0.65	1/2113 (0.0%)
51	m	0.55	0/380	0.98	0/498
52	n	0.77	4/1434 (0.3%)	0.91	7/1926 (0.4%)
53	o	0.47	0/513	0.73	0/676
54	p	0.60	3/1333 (0.2%)	0.78	4/1805 (0.2%)
55	q	0.77	1/303 (0.3%)	0.84	1/397 (0.3%)
56	r	0.43	0/1122	0.60	0/1515
57	s	0.50	0/1152	0.64	0/1551
58	t	0.51	0/955	0.69	0/1279
59	u	0.50	0/1062	0.71	0/1413
60	v	0.53	0/1093	0.68	0/1460
61	w	0.51	0/964	0.69	0/1289
62	x	0.46	0/902	0.61	0/1209
63	y	0.54	0/929	0.65	0/1242
64	z	0.53	0/960	0.80	2/1278 (0.2%)
All	All	0.63	57/189114 (0.0%)	1.04	421/278734 (0.2%)

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	9	0	3

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Mol	Chain	#Chirality outliers	#Planarity outliers
11	AA	0	10
14	AE	0	5
20	H	0	1
27	O	0	1
30	R	0	1
36	X	0	1
40	b	0	1
52	n	0	1
53	o	0	1
54	p	0	1
All	All	0	26

All (57) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	C	41	PRO	N-CA	14.00	1.71	1.47
46	h	107	PRO	CG-CD	-14.00	1.04	1.50
30	R	42	PRO	N-CA	13.72	1.70	1.47
52	n	176	PRO	CG-CD	-13.50	1.06	1.50
52	n	29	PRO	CG-CD	-11.86	1.11	1.50
11	AA	374	GLU	C-N	10.40	1.54	1.34
52	n	29	PRO	N-CD	9.34	1.60	1.47
54	p	154	PRO	CG-CD	-8.76	1.21	1.50
6	5	109	DT	O3'-P	8.71	1.71	1.61
7	6	10	DG	C1'-N9	-8.25	1.35	1.47
11	AA	850	ILE	N-CA	-8.17	1.30	1.46
39	a	462	C	C4-C5	-8.11	1.36	1.43
39	a	2013	A	C6-N1	-7.67	1.30	1.35
20	H	169	SER	N-CA	7.49	1.61	1.46
46	h	107	PRO	N-CD	7.40	1.58	1.47
47	i	8	PRO	CG-CD	-7.36	1.26	1.50
6	5	121	DG	C1'-N9	-7.25	1.37	1.47
8	7	19	G	C1'-N9	-7.22	1.36	1.46
16	D	563	A	C6-N1	-7.17	1.30	1.35
39	a	462	C	N1-C6	-7.16	1.32	1.37
39	a	2013	A	C6-N6	-7.03	1.28	1.33
8	7	-7	U	C1'-N1	6.94	1.59	1.48
16	D	397	A	C6-N1	-6.88	1.30	1.35
39	a	1141	U	N3-C4	-6.78	1.32	1.38
52	n	176	PRO	N-CD	6.76	1.57	1.47
16	D	37	U	N3-C4	-6.73	1.32	1.38
15	C	40	VAL	C-N	6.72	1.47	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
54	p	154	PRO	N-CD	6.68	1.57	1.47
6	5	112	DG	C1'-N9	-6.63	1.38	1.47
6	5	100	DA	C1'-N9	-6.58	1.38	1.47
7	6	21	DA	C1'-N9	-6.51	1.38	1.47
39	a	2613	U	N3-C4	-6.45	1.32	1.38
39	a	1021	A	C6-N1	-6.44	1.31	1.35
55	q	1	MET	N-CA	6.34	1.59	1.46
30	R	41	THR	C-N	6.32	1.46	1.34
39	a	1142	A	C6-N1	-6.24	1.31	1.35
14	AE	93	THR	CA-C	6.22	1.69	1.52
6	5	115	DA	C1'-N9	-6.08	1.38	1.47
6	5	116	DG	C1'-N9	-6.07	1.38	1.47
33	U	34	GLU	CG-CD	5.90	1.60	1.51
14	AE	70	CYS	CA-CB	-5.85	1.41	1.53
7	6	28	DA	C1'-N9	-5.75	1.39	1.47
16	D	1125	U	P-O5'	-5.70	1.54	1.59
33	U	34	GLU	CB-CG	-5.61	1.41	1.52
16	D	1358	U	N3-C4	-5.60	1.33	1.38
16	D	827	U	N3-C4	-5.58	1.33	1.38
16	D	1363	A	C6-N6	-5.40	1.29	1.33
16	D	1363	A	C6-N1	-5.38	1.31	1.35
16	D	563	A	C6-N6	-5.37	1.29	1.33
39	a	1082	U	N3-C4	-5.36	1.33	1.38
39	a	1021	A	C6-N6	-5.30	1.29	1.33
7	6	24	DT	C1'-N1	5.28	1.56	1.49
39	a	1019	U	N3-C4	-5.27	1.33	1.38
15	C	10	PHE	CB-CG	5.16	1.60	1.51
39	a	74	A	C6-N1	-5.11	1.31	1.35
54	p	153	ARG	C-N	-5.05	1.24	1.34
14	AE	801	VAL	CB-CG2	-5.05	1.42	1.52

All (421) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	D	37	U	C5-C4-O4	34.28	146.47	125.90
39	a	1141	U	C5-C4-O4	33.53	146.02	125.90
16	D	1358	U	C5-C4-O4	31.93	145.06	125.90
16	D	37	U	N3-C4-O4	-31.78	97.16	119.40
39	a	1019	U	C5-C4-O4	31.05	144.53	125.90
16	D	884	U	C5-C4-O4	30.65	144.29	125.90
39	a	2613	U	C5-C4-O4	30.51	144.21	125.90
39	a	1082	U	C5-C4-O4	30.37	144.12	125.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	D	827	U	C5-C4-O4	30.05	143.93	125.90
39	a	1141	U	N3-C4-O4	-29.54	98.72	119.40
16	D	1358	U	N3-C4-O4	-29.48	98.77	119.40
39	a	1082	U	N3-C4-O4	-29.35	98.85	119.40
16	D	884	U	N3-C4-O4	-29.14	99.00	119.40
16	D	827	U	N3-C4-O4	-28.93	99.15	119.40
39	a	1019	U	N3-C4-O4	-28.47	99.47	119.40
39	a	2613	U	N3-C4-O4	-27.18	100.38	119.40
39	a	1021	A	N1-C6-N6	-21.07	105.96	118.60
39	a	1142	A	N1-C6-N6	-20.61	106.24	118.60
16	D	397	A	N1-C6-N6	-20.37	106.38	118.60
16	D	563	A	N1-C6-N6	-19.01	107.19	118.60
39	a	1086	A	N1-C6-N6	-18.66	107.41	118.60
39	a	2013	A	N1-C6-N6	-18.32	107.61	118.60
39	a	462	C	C5-C6-N1	17.71	129.85	121.00
46	h	107	PRO	N-CD-CG	-16.88	77.88	103.20
52	n	29	PRO	N-CD-CG	-16.56	78.36	103.20
16	D	872	A	N1-C6-N6	-16.48	108.71	118.60
54	p	154	PRO	N-CD-CG	-16.45	78.52	103.20
39	a	462	C	C6-N1-C2	-16.28	113.79	120.30
52	n	176	PRO	N-CD-CG	-15.69	79.67	103.20
16	D	1363	A	N1-C6-N6	-15.28	109.44	118.60
10	A	39	C	C4-C5-C6	15.00	124.90	117.40
10	B	39	C	C4-C5-C6	14.94	124.87	117.40
39	a	2756	U	N3-C4-O4	-14.19	109.47	119.40
39	a	67	U	N3-C4-O4	-13.59	109.89	119.40
64	z	55	ARG	NE-CZ-NH2	12.85	126.73	120.30
39	a	1021	A	C5-C6-N6	12.68	133.85	123.70
16	D	397	A	C5-C6-N6	12.26	133.51	123.70
10	A	39	C	N3-C4-C5	-12.24	117.00	121.90
10	B	39	C	N3-C4-C5	-12.18	117.03	121.90
39	a	1086	A	C5-C6-N6	11.51	132.91	123.70
39	a	1142	A	C5-C6-N6	11.35	132.78	123.70
39	a	1141	U	C2-N3-C4	11.32	133.79	127.00
16	D	563	A	C5-C6-N6	11.22	132.68	123.70
11	AA	1250	SER	C-N-CA	11.18	149.66	121.70
64	z	55	ARG	NE-CZ-NH1	-10.71	114.94	120.30
47	i	8	PRO	N-CD-CG	-10.18	87.94	103.20
16	D	1125	U	O5'-P-OP2	-10.11	96.60	105.70
20	H	169	SER	N-CA-C	10.02	138.04	111.00
15	C	41	PRO	CA-N-CD	-10.00	97.50	111.50
39	a	461	C	N1-C2-O2	9.80	124.78	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	a	1082	U	N1-C2-N3	-9.68	109.09	114.90
39	a	1082	U	C2-N3-C4	9.67	132.81	127.00
39	a	2496	C	N3-C2-O2	-9.53	115.23	121.90
39	a	974	G	O4'-C1'-N9	9.51	115.81	108.20
14	AE	271	ARG	NE-CZ-NH2	-9.39	115.61	120.30
11	AA	375	PRO	CA-N-CD	-9.30	98.48	111.50
39	a	2013	A	C5-C6-N6	9.08	130.97	123.70
39	a	2496	C	N1-C2-O2	9.03	124.32	118.90
16	D	1363	A	C5-C6-N6	9.00	130.90	123.70
39	a	1082	U	C4-C5-C6	-8.91	114.36	119.70
16	D	37	U	C2-N3-C4	8.88	132.33	127.00
39	a	1019	U	C2-N3-C4	8.88	132.33	127.00
16	D	397	A	N1-C2-N3	-8.77	124.92	129.30
16	D	872	A	C5-C6-N6	8.75	130.70	123.70
20	H	88	LYS	C-N-CA	8.72	143.50	121.70
39	a	2756	U	C5-C4-O4	8.61	131.07	125.90
39	a	729	G	O4'-C1'-N9	8.49	114.99	108.20
16	D	1358	U	C2-N3-C4	8.46	132.08	127.00
39	a	2013	A	N1-C2-N3	-8.39	125.10	129.30
39	a	2758	A	N1-C6-N6	-8.38	113.57	118.60
39	a	1141	U	N1-C2-N3	-8.32	109.91	114.90
11	AA	995	ASP	O-C-N	-8.26	109.49	122.70
39	a	67	U	C5-C4-O4	8.18	130.81	125.90
39	a	74	A	N1-C6-N6	-8.12	113.72	118.60
11	AA	376	PRO	N-CA-CB	-8.02	93.67	103.30
52	n	29	PRO	CA-CB-CG	-7.99	88.82	104.00
52	n	176	PRO	CA-N-CD	-7.97	100.34	111.50
16	D	1358	U	N1-C2-N3	-7.96	110.12	114.90
16	D	1145	A	N9-C4-C5	-7.87	102.65	105.80
30	R	42	PRO	CA-N-CD	-7.85	100.51	111.50
54	p	154	PRO	CA-CB-CG	-7.73	89.31	104.00
46	h	107	PRO	CA-N-CD	-7.67	100.75	111.50
52	n	29	PRO	CA-N-CD	-7.62	100.83	111.50
16	D	37	U	N1-C2-N3	-7.60	110.34	114.90
20	H	305	HIS	N-CA-C	7.47	131.18	111.00
39	a	2013	A	C5-C6-N1	7.45	121.42	117.70
39	a	1141	U	C4-C5-C6	-7.44	115.24	119.70
39	a	2613	U	C2-N3-C4	7.42	131.45	127.00
39	a	143	C	N1-C2-O2	7.36	123.32	118.90
39	a	196	A	O4'-C1'-N9	7.36	114.09	108.20
39	a	2013	A	N9-C4-C5	-7.30	102.88	105.80
10	B	39	C	C5-C6-N1	-7.29	117.36	121.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	D	754	C	N1-C2-O2	7.26	123.26	118.90
10	A	39	C	C5-C6-N1	-7.25	117.37	121.00
16	D	1016	A	N1-C6-N6	7.24	122.94	118.60
16	D	37	U	C4-C5-C6	-7.24	115.36	119.70
8	7	-8	A	OP2-P-O3'	7.21	121.06	105.20
39	a	357	C	N3-C2-O2	-7.20	116.86	121.90
39	a	910	A	N1-C6-N6	-7.19	114.28	118.60
10	B	76	A	O4'-C1'-N9	7.11	113.88	108.20
39	a	461	C	C2-N1-C1'	7.01	126.52	118.80
39	a	1019	U	N1-C2-N3	-6.99	110.70	114.90
10	A	76	A	O4'-C1'-N9	6.99	113.79	108.20
39	a	2641	G	N3-C4-N9	-6.99	121.81	126.00
10	A	37	A	C5-C6-N6	6.95	129.26	123.70
39	a	2329	U	C5-C6-N1	6.94	126.17	122.70
16	D	1145	A	C4-C5-N7	6.92	114.16	110.70
11	AA	855	PRO	N-CA-CB	-6.89	95.02	102.60
10	B	37	A	C5-C6-N6	6.87	129.20	123.70
39	a	1638	C	N1-C2-O2	6.82	122.99	118.90
39	a	1044	C	C6-N1-C2	6.81	123.03	120.30
8	7	-8	A	O3'-P-O5'	-6.78	91.11	104.00
39	a	1816	C	C6-N1-C2	6.75	123.00	120.30
39	a	2771	C	N1-C2-O2	6.74	122.94	118.90
11	AA	995	ASP	CA-C-N	6.74	132.02	117.20
39	a	2758	A	C5-C6-N6	6.73	129.08	123.70
16	D	884	U	C2-N3-C4	6.72	131.03	127.00
39	a	1021	A	N1-C2-N3	-6.69	125.95	129.30
46	h	107	PRO	CA-CB-CG	-6.67	91.33	104.00
39	a	461	C	C6-N1-C1'	-6.62	112.85	120.80
39	a	1832	C	N1-C2-O2	6.61	122.86	118.90
39	a	357	C	N1-C2-O2	6.59	122.86	118.90
39	a	2606	C	N3-C2-O2	-6.59	117.28	121.90
10	A	37	A	N1-C6-N6	-6.59	114.64	118.60
10	A	71	C	C2-N1-C1'	6.59	126.05	118.80
10	B	71	C	C2-N1-C1'	6.58	126.04	118.80
39	a	1604	C	N1-C2-O2	6.58	122.85	118.90
39	a	1142	A	C5-C6-N1	6.57	120.98	117.70
39	a	1170	C	C2-N1-C1'	6.56	126.01	118.80
16	D	1191	A	N1-C6-N6	6.54	122.52	118.60
16	D	1145	A	C5-C6-N1	6.52	120.96	117.70
39	a	1499	C	C6-N1-C2	-6.50	117.70	120.30
39	a	2374	C	N1-C2-O2	6.50	122.80	118.90
10	B	37	A	N1-C6-N6	-6.48	114.71	118.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
20	H	339	ARG	C-N-CA	6.47	137.87	121.70
39	a	2638	G	O4'-C1'-N9	6.47	113.37	108.20
39	a	2673	G	N3-C2-N2	-6.46	115.38	119.90
16	D	1358	U	C4-C5-C6	-6.46	115.83	119.70
39	a	1857	G	O4'-C1'-N9	6.46	113.37	108.20
11	AA	935	THR	CA-CB-OG1	-6.44	95.48	109.00
39	a	2756	U	N3-C4-C5	6.44	118.46	114.60
16	D	1016	A	C5-C6-N6	-6.43	118.56	123.70
39	a	704	G	O4'-C1'-N9	6.39	113.31	108.20
10	A	61	C	N1-C2-O2	6.37	122.72	118.90
16	D	1140	C	C6-N1-C2	6.37	122.85	120.30
16	D	884	U	C4-C5-C6	-6.37	115.88	119.70
39	a	2013	A	C4-C5-N7	6.37	113.88	110.70
39	a	1019	U	C4-C5-C6	-6.35	115.89	119.70
39	a	2159	G	N1-C6-O6	-6.34	116.09	119.90
16	D	1125	U	C2-N1-C1'	6.34	125.31	117.70
39	a	1557	C	C6-N1-C2	6.34	122.83	120.30
6	5	109	DT	P-O3'-C3'	6.32	127.28	119.70
16	D	1208	C	C6-N1-C2	6.29	122.82	120.30
16	D	869	G	N3-C4-C5	6.27	131.74	128.60
39	a	1893	C	N3-C4-N4	-6.27	113.61	118.00
39	a	462	C	N1-C2-O2	6.26	122.66	118.90
39	a	322	A	N1-C6-N6	-6.25	114.85	118.60
16	D	674	G	C8-N9-C4	-6.24	103.90	106.40
39	a	2591	C	N1-C2-O2	6.24	122.64	118.90
39	a	837	C	N3-C2-O2	-6.23	117.54	121.90
13	AC	117	HIS	CB-CA-C	-6.23	97.95	110.40
39	a	992	C	C6-N1-C2	6.20	122.78	120.30
39	a	1012	U	N3-C4-O4	6.20	123.74	119.40
55	q	34	LYS	CD-CE-NZ	6.18	125.92	111.70
39	a	910	A	C8-N9-C4	6.15	108.26	105.80
11	AA	849	GLU	C-N-CA	6.13	137.02	121.70
39	a	65	U	C5-C6-N1	6.13	125.76	122.70
10	B	61	C	N1-C2-O2	6.12	122.57	118.90
39	a	2050	C	N3-C2-O2	-6.12	117.62	121.90
39	a	2013	A	C4-C5-C6	-6.10	113.95	117.00
39	a	301	G	N3-C4-C5	6.10	131.65	128.60
39	a	462	C	C2-N1-C1'	6.08	125.49	118.80
16	D	1363	A	N1-C2-N3	-6.07	126.27	129.30
39	a	2756	U	C4-C5-C6	-6.06	116.06	119.70
52	n	176	PRO	N-CA-CB	-6.05	95.94	102.60
39	a	462	C	N3-C4-C5	-6.04	119.49	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	a	2050	C	N1-C2-O2	6.03	122.52	118.90
39	a	1806	C	N1-C2-O2	6.03	122.52	118.90
16	D	1344	C	N3-C2-O2	-6.03	117.68	121.90
39	a	1	G	C4-N9-C1'	6.02	134.33	126.50
39	a	1	G	C8-N9-C1'	-6.01	119.19	127.00
39	a	221	A	O4'-C1'-N9	6.00	113.00	108.20
16	D	754	C	N3-C2-O2	-6.00	117.70	121.90
39	a	1638	C	N3-C2-O2	-6.00	117.70	121.90
54	p	154	PRO	N-CA-CB	-5.99	96.01	102.60
11	AA	1004	ASP	CB-CA-C	5.98	122.37	110.40
20	H	140	PRO	N-CA-CB	5.98	110.47	103.30
16	D	674	G	N7-C8-N9	5.97	116.09	113.10
39	a	1	G	N3-C4-N9	5.97	129.58	126.00
16	D	1124	G	C5'-C4'-O4'	-5.95	101.96	109.10
16	D	18	C	C6-N1-C2	5.95	122.68	120.30
39	a	2606	C	N1-C2-O2	5.94	122.47	118.90
39	a	2161	C	N1-C2-O2	5.94	122.46	118.90
16	D	1125	U	OP1-P-OP2	5.93	128.50	119.60
16	D	1125	U	C5-C4-O4	-5.92	122.35	125.90
39	a	1012	U	C5-C4-O4	-5.91	122.35	125.90
11	AA	727	VAL	N-CA-C	-5.91	95.05	111.00
11	AA	943	LYS	CA-C-O	-5.91	107.69	120.10
20	H	336	ASP	CB-CA-C	-5.90	98.60	110.40
39	a	67	U	N3-C4-C5	5.90	118.14	114.60
16	D	1125	U	N3-C4-O4	5.89	123.52	119.40
16	D	1150	A	C8-N9-C4	-5.89	103.44	105.80
20	H	330	VAL	N-CA-C	5.88	126.88	111.00
39	a	527	C	N3-C4-N4	-5.88	113.88	118.00
39	a	487	C	N3-C2-O2	-5.87	117.79	121.90
11	AA	943	LYS	CA-C-N	5.85	130.07	117.20
39	a	1798	U	C2-N1-C1'	-5.84	110.69	117.70
39	a	557	C	C6-N1-C2	5.84	122.64	120.30
46	h	107	PRO	N-CA-CB	-5.83	96.19	102.60
39	a	2834	G	N3-C4-N9	-5.82	122.51	126.00
20	H	132	PRO	N-CA-CB	5.81	110.28	103.30
16	D	1340	A	C5'-C4'-O4'	5.81	116.07	109.10
15	C	41	PRO	N-CD-CG	5.78	111.87	103.20
20	H	168	VAL	C-N-CA	5.78	136.15	121.70
39	a	2827	C	C6-N1-C2	5.78	122.61	120.30
14	AE	903	LEU	C-N-CA	5.77	136.13	121.70
16	D	290	C	C6-N1-C2	5.77	122.61	120.30
16	D	528	C	N1-C2-O2	5.77	122.36	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	D	827	U	C4-C5-C6	-5.76	116.24	119.70
39	a	2	G	C4-N9-C1'	5.76	133.98	126.50
39	a	876	C	C6-N1-C2	5.75	122.60	120.30
39	a	2110	G	N3-C4-C5	-5.75	125.72	128.60
39	a	2641	G	N3-C4-C5	5.75	131.48	128.60
39	a	942	G	C2-N3-C4	-5.74	109.03	111.90
16	D	872	A	C5-C6-N1	5.73	120.57	117.70
39	a	281	C	N3-C2-O2	-5.73	117.89	121.90
39	a	2795	C	C6-N1-C2	5.73	122.59	120.30
16	D	1124	G	O5'-P-OP2	-5.71	100.56	105.70
42	d	12	C	N3-C4-N4	-5.70	114.01	118.00
39	a	1379	U	C5-C4-O4	5.70	129.32	125.90
39	a	2374	C	N3-C2-O2	-5.69	117.92	121.90
20	H	344	LEU	CA-CB-CG	5.68	128.35	115.30
39	a	2096	C	C6-N1-C2	5.68	122.57	120.30
16	D	141	G	N9-C4-C5	-5.67	103.13	105.40
39	a	942	G	N3-C4-C5	5.67	131.44	128.60
39	a	1414	C	C2-N1-C1'	-5.67	112.57	118.80
39	a	838	C	N1-C2-O2	5.66	122.30	118.90
39	a	2061	G	O4'-C1'-N9	5.66	112.73	108.20
39	a	1170	C	C6-N1-C1'	-5.66	114.01	120.80
16	D	22	G	N3-C2-N2	-5.64	115.95	119.90
39	a	1363	C	N3-C4-N4	-5.63	114.06	118.00
16	D	1127	G	C5-C6-O6	-5.63	125.22	128.60
16	D	60	A	O4'-C1'-N9	5.62	112.70	108.20
16	D	35	G	C4-N9-C1'	5.62	133.81	126.50
16	D	647	C	C6-N1-C2	5.62	122.55	120.30
39	a	2591	C	C2-N1-C1'	5.62	124.98	118.80
16	D	1208	C	N3-C4-C5	5.61	124.15	121.90
16	D	1109	C	N1-C1'-C2'	-5.61	105.83	112.00
14	AE	363	LEU	CA-CB-CG	5.59	128.15	115.30
39	a	462	C	N3-C2-O2	-5.58	117.99	121.90
39	a	1021	A	C4-C5-C6	-5.58	114.21	117.00
39	a	1577	C	C6-N1-C2	5.58	122.53	120.30
39	a	1775	U	C5-C4-O4	-5.58	122.56	125.90
39	a	2493	U	C5-C4-O4	-5.58	122.56	125.90
39	a	995	C	N3-C4-N4	5.57	121.90	118.00
39	a	1479	G	N3-C4-N9	-5.56	122.66	126.00
39	a	2727	A	N9-C4-C5	-5.56	103.58	105.80
39	a	1354	A	N1-C6-N6	5.53	121.92	118.60
39	a	161	A	N1-C6-N6	5.53	121.92	118.60
39	a	487	C	N1-C2-O2	5.53	122.22	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	D	781	A	N1-C6-N6	5.53	121.92	118.60
39	a	231	A	C8-N9-C4	-5.52	103.59	105.80
39	a	2380	C	N1-C2-O2	5.52	122.21	118.90
39	a	1549	A	N1-C6-N6	-5.52	115.29	118.60
39	a	74	A	C5-C6-N6	5.50	128.10	123.70
16	D	1191	A	C5-C6-N6	-5.50	119.30	123.70
39	a	498	G	N3-C2-N2	-5.49	116.06	119.90
16	D	977	A	N1-C6-N6	5.47	121.88	118.60
39	a	1270	C	N1-C2-O2	-5.46	115.62	118.90
39	a	1166	G	N3-C2-N2	-5.46	116.08	119.90
39	a	2771	C	C2-N1-C1'	5.45	124.80	118.80
39	a	273	G	N9-C4-C5	-5.45	103.22	105.40
11	AA	1233	LEU	CA-CB-CG	5.45	127.83	115.30
37	Y	102	ARG	NE-CZ-NH2	5.45	123.02	120.30
52	n	176	PRO	CA-CB-CG	-5.45	93.65	104.00
39	a	143	C	N3-C2-O2	-5.45	118.09	121.90
16	D	1363	A	C4-C5-C6	-5.45	114.28	117.00
39	a	2444	G	N1-C6-O6	-5.45	116.63	119.90
39	a	819	A	N9-C4-C5	-5.43	103.63	105.80
39	a	1433	A	N1-C6-N6	5.43	121.86	118.60
16	D	1344	C	N1-C2-O2	5.41	122.15	118.90
39	a	1906	G	C4-N9-C1'	5.41	133.54	126.50
39	a	910	A	C4-C5-C6	-5.41	114.30	117.00
16	D	715	A	N1-C6-N6	5.40	121.84	118.60
39	a	2493	U	C6-N1-C1'	-5.40	113.64	121.20
16	D	386	C	N3-C2-O2	-5.40	118.12	121.90
16	D	1103	C	N1-C2-O2	5.40	122.14	118.90
39	a	130	C	C6-N1-C2	5.39	122.45	120.30
47	i	8	PRO	CA-CB-CG	-5.39	93.76	104.00
39	a	2	G	C8-N9-C1'	-5.39	120.00	127.00
16	D	1480	A	N9-C4-C5	-5.38	103.65	105.80
39	a	625	G	N3-C2-N2	5.38	123.67	119.90
50	l	188	MET	CG-SD-CE	5.37	108.79	100.20
54	p	154	PRO	CA-N-CD	-5.37	103.99	111.50
16	D	1113	C	N1-C2-O2	5.36	122.12	118.90
16	D	1363	A	N9-C4-C5	-5.36	103.66	105.80
16	D	316	C	N1-C2-O2	5.35	122.11	118.90
16	D	1220	G	N3-C4-N9	-5.35	122.79	126.00
16	D	715	A	C5-C6-N6	-5.35	119.42	123.70
39	a	1277	G	N9-C4-C5	-5.35	103.26	105.40
39	a	2248	C	N1-C2-O2	5.35	122.11	118.90
16	D	1314	C	N1-C2-O2	5.34	122.11	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	a	2089	C	C6-N1-C2	5.34	122.44	120.30
39	a	2248	C	N3-C2-O2	-5.33	118.17	121.90
39	a	2463	C	C6-N1-C2	5.32	122.43	120.30
39	a	1906	G	C8-N9-C1'	-5.32	120.08	127.00
10	B	60	U	P-O3'-C3'	5.32	126.08	119.70
39	a	1395	A	O4'-C1'-N9	5.32	112.45	108.20
9	9	79	PRO	CA-N-CD	-5.31	104.06	111.50
16	D	342	C	C6-N1-C2	5.31	122.42	120.30
39	a	605	G	N3-C4-N9	-5.31	122.81	126.00
39	a	1726	C	C6-N1-C2	5.30	122.42	120.30
16	D	1323	G	C6-C5-N7	-5.28	127.23	130.40
16	D	330	C	N3-C4-C5	5.28	124.01	121.90
11	AA	728	ASP	N-CA-C	5.28	125.25	111.00
39	a	1533	C	N1-C2-O2	5.26	122.06	118.90
39	a	27	G	O4'-C1'-N9	5.25	112.40	108.20
10	A	60	U	P-O3'-C3'	5.25	126.00	119.70
16	D	1316	G	N3-C4-N9	-5.25	122.85	126.00
39	a	1503	A	N9-C4-C5	-5.24	103.70	105.80
10	B	31	G	O4'-C1'-N9	5.24	112.39	108.20
39	a	2084	C	C6-N1-C2	5.24	122.39	120.30
39	a	2048	G	C4-N9-C1'	5.23	133.30	126.50
39	a	2517	C	N3-C2-O2	-5.23	118.24	121.90
39	a	2901	C	N3-C2-O2	-5.23	118.24	121.90
39	a	353	C	N1-C2-O2	5.23	122.04	118.90
16	D	1124	G	OP2-P-O3'	-5.22	93.71	105.20
37	Y	137	LEU	CA-CB-CG	5.22	127.30	115.30
39	a	231	A	N7-C8-N9	5.22	116.41	113.80
39	a	462	C	C4-C5-C6	-5.21	114.79	117.40
39	a	1574	C	C6-N1-C2	5.21	122.39	120.30
16	D	470	C	N1-C2-O2	5.21	122.03	118.90
39	a	2472	G	N3-C4-C5	5.21	131.20	128.60
39	a	2827	C	N3-C4-C5	5.21	123.98	121.90
8	7	-5	U	C2'-C3'-O3'	5.20	122.03	113.70
16	D	141	G	C8-N9-C4	5.20	108.48	106.40
39	a	2567	G	N1-C2-N2	-5.20	111.52	116.20
39	a	2257	U	C5-C4-O4	-5.19	122.78	125.90
39	a	1142	A	C4-C5-C6	-5.19	114.41	117.00
16	D	1134	G	N3-C4-C5	5.19	131.19	128.60
16	D	767	A	N1-C6-N6	5.19	121.71	118.60
39	a	2641	G	C6-C5-N7	5.19	133.51	130.40
39	a	1379	U	N3-C4-O4	-5.18	115.77	119.40
39	a	795	C	C6-N1-C2	5.18	122.37	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	a	2159	G	C5-C6-O6	5.18	131.71	128.60
39	a	2527	C	C6-N1-C2	5.18	122.37	120.30
20	H	169	SER	N-CA-CB	-5.17	102.74	110.50
39	a	500	G	N3-C4-N9	-5.17	122.90	126.00
11	AA	817	LEU	CB-CG-CD2	-5.16	102.22	111.00
39	a	1564	C	C2-N1-C1'	5.16	124.48	118.80
39	a	2190	G	C8-N9-C4	-5.16	104.33	106.40
39	a	605	G	N3-C2-N2	-5.16	116.29	119.90
16	D	20	U	C2-N3-C4	-5.16	123.91	127.00
16	D	161	A	N1-C6-N6	-5.15	115.51	118.60
16	D	1248	A	N1-C6-N6	-5.15	115.51	118.60
16	D	1323	G	N3-C4-N9	5.15	129.09	126.00
39	a	2848	G	O4'-C1'-N9	5.15	112.32	108.20
10	B	71	C	C6-N1-C1'	-5.15	114.62	120.80
39	a	2284	A	N9-C4-C5	-5.15	103.74	105.80
39	a	313	G	N3-C2-N2	5.15	123.50	119.90
39	a	1086	A	N1-C2-N3	-5.14	126.73	129.30
10	A	31	G	O4'-C1'-N9	5.14	112.31	108.20
16	D	1466	C	N1-C2-O2	5.14	121.98	118.90
10	A	71	C	C6-N1-C1'	-5.12	114.66	120.80
39	a	281	C	N1-C2-O2	5.12	121.97	118.90
39	a	517	C	C6-N1-C2	5.12	122.35	120.30
39	a	851	C	C6-N1-C2	5.12	122.35	120.30
39	a	2473	U	N1-C2-O2	5.12	126.38	122.80
16	D	69	G	N9-C4-C5	-5.12	103.35	105.40
16	D	36	C	C6-N1-C2	5.10	122.34	120.30
39	a	993	G	N3-C4-N9	-5.10	122.94	126.00
39	a	742	A	C5-C6-N1	5.10	120.25	117.70
42	d	12	C	C6-N1-C2	5.10	122.34	120.30
39	a	2119	A	N1-C6-N6	-5.10	115.54	118.60
39	a	2332	C	N3-C4-N4	-5.10	114.43	118.00
39	a	1573	G	N3-C2-N2	-5.10	116.33	119.90
39	a	2473	U	C2-N1-C1'	5.10	123.82	117.70
39	a	2161	C	N3-C2-O2	-5.10	118.33	121.90
39	a	1198	U	C6-N1-C2	-5.09	117.94	121.00
39	a	1198	U	N3-C2-O2	-5.09	118.63	122.20
16	D	1333	A	N1-C6-N6	5.09	121.66	118.60
39	a	2493	U	C5'-C4'-O4'	5.09	115.21	109.10
16	D	280	C	N3-C4-N4	-5.09	114.44	118.00
39	a	1816	C	N3-C4-C5	5.09	123.94	121.90
16	D	438	U	O4'-C1'-N1	5.09	112.27	108.20
16	D	687	A	O4'-C1'-N9	5.08	112.27	108.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
39	a	2338	C	C6-N1-C2	5.08	122.33	120.30
16	D	230	G	N3-C4-N9	-5.08	122.95	126.00
16	D	827	U	C2-N3-C4	5.08	130.05	127.00
39	a	752	A	N1-C6-N6	5.08	121.64	118.60
39	a	1773	A	N9-C1'-C2'	-5.08	106.42	112.00
39	a	2357	G	N3-C4-C5	5.08	131.14	128.60
39	a	2613	U	C4-C5-C6	-5.07	116.66	119.70
16	D	457	G	N9-C4-C5	-5.07	103.37	105.40
39	a	1504	A	C8-N9-C4	5.07	107.83	105.80
16	D	1220	G	N3-C4-C5	5.07	131.13	128.60
39	a	121	G	N9-C4-C5	-5.06	103.38	105.40
39	a	2198	A	N1-C6-N6	-5.06	115.57	118.60
39	a	1339	G	N3-C2-N2	5.05	123.44	119.90
14	AE	807	LEU	CB-CG-CD2	-5.05	102.41	111.00
16	D	1158	C	N3-C4-C5	-5.05	119.88	121.90
39	a	300	A	C8-N9-C4	5.05	107.82	105.80
16	D	1016	A	N9-C4-C5	-5.05	103.78	105.80
39	a	476	G	N3-C4-C5	5.05	131.13	128.60
39	a	2385	C	N1-C2-O2	5.05	121.93	118.90
16	D	35	G	N7-C8-N9	5.04	115.62	113.10
16	D	443	C	C6-N1-C2	5.04	122.31	120.30
39	a	121	G	N3-C4-N9	5.04	129.02	126.00
39	a	819	A	C8-N9-C4	5.03	107.81	105.80
39	a	1581	G	C8-N9-C1'	-5.03	120.46	127.00
39	a	1920	C	N3-C4-C5	5.03	123.91	121.90
20	H	332	VAL	N-CA-C	5.03	124.57	111.00
20	H	153	GLU	N-CA-C	-5.02	97.44	111.00
39	a	1313	U	C2-N1-C1'	5.02	123.73	117.70
16	D	754	C	C2-N1-C1'	5.01	124.32	118.80
39	a	1408	G	C4-N9-C1'	5.01	133.02	126.50
16	D	483	C	N3-C2-O2	-5.01	118.39	121.90
39	a	2322	A	N1-C6-N6	-5.01	115.60	118.60
39	a	481	G	O4'-C1'-N9	5.00	112.20	108.20
39	a	1805	A	N1-C6-N6	-5.00	115.60	118.60
39	a	1848	A	N1-C6-N6	-5.00	115.60	118.60

There are no chirality outliers.

All (26) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
9	9	107	GLU	Peptide
9	9	79	PRO	Peptide

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Mol	Chain	Res	Type	Group
9	9	92	ALA	Peptide
11	AA	1134	GLN	Peptide
11	AA	1157	GLN	Peptide
11	AA	1158	LYS	Peptide
11	AA	205	PRO	Peptide
11	AA	594	VAL	Peptide
11	AA	595	THR	Peptide
11	AA	596	ASP	Mainchain
11	AA	696	ASP	Peptide
11	AA	746	ALA	Peptide
11	AA	853	ASP	Mainchain
14	AE	1184	ASP	Peptide
14	AE	1326	GLN	Peptide
14	AE	313	GLY	Peptide
14	AE	416	ILE	Peptide
14	AE	804	ALA	Peptide
20	H	274	TYR	Peptide
27	O	12	ARG	Peptide
30	R	44	LYS	Peptide
36	X	65	VAL	Peptide
40	b	11	ARG	Peptide
52	n	176	PRO	Peptide
53	o	31	HIS	Peptide
54	p	47	ASP	Peptide

5.2 Too-close contacts

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

5.3 Torsion angles

5.3.1 Protein backbone

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.

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	101/103 (98%)	89 (88%)	12 (12%)	0	100	100
2	1	108/110 (98%)	99 (92%)	9 (8%)	0	100	100
3	2	92/94 (98%)	87 (95%)	5 (5%)	0	100	100
4	3	101/103 (98%)	93 (92%)	7 (7%)	1 (1%)	13	44
5	4	92/94 (98%)	82 (89%)	10 (11%)	0	100	100
9	9	146/148 (99%)	112 (77%)	33 (23%)	1 (1%)	19	51
11	AA	1318/1342 (98%)	1149 (87%)	137 (10%)	32 (2%)	5	30
12	AB	94/181 (52%)	88 (94%)	6 (6%)	0	100	100
13	AC	228/230 (99%)	215 (94%)	11 (5%)	2 (1%)	14	47
13	AD	226/230 (98%)	212 (94%)	14 (6%)	0	100	100
14	AE	1329/1407 (94%)	1199 (90%)	121 (9%)	9 (1%)	19	51
15	C	64/66 (97%)	59 (92%)	4 (6%)	1 (2%)	8	37
17	E	84/86 (98%)	82 (98%)	2 (2%)	0	100	100
18	F	68/70 (97%)	68 (100%)	0	0	100	100
19	G	223/225 (99%)	201 (90%)	22 (10%)	0	100	100
20	H	255/557 (46%)	187 (73%)	56 (22%)	12 (5%)	2	19
21	I	206/208 (99%)	197 (96%)	8 (4%)	1 (0%)	25	57
22	J	203/205 (99%)	198 (98%)	5 (2%)	0	100	100
23	K	154/156 (99%)	140 (91%)	13 (8%)	1 (1%)	22	54
24	L	102/104 (98%)	95 (93%)	7 (7%)	0	100	100
25	M	149/151 (99%)	142 (95%)	7 (5%)	0	100	100
26	N	127/129 (98%)	110 (87%)	17 (13%)	0	100	100
27	O	125/127 (98%)	111 (89%)	14 (11%)	0	100	100
28	P	97/99 (98%)	88 (91%)	8 (8%)	1 (1%)	13	44
29	Q	115/117 (98%)	104 (90%)	11 (10%)	0	100	100
30	R	117/124 (94%)	105 (90%)	11 (9%)	1 (1%)	14	47
31	S	98/100 (98%)	95 (97%)	2 (2%)	1 (1%)	13	44
32	T	86/88 (98%)	82 (95%)	4 (5%)	0	100	100
33	U	80/82 (98%)	74 (92%)	6 (8%)	0	100	100
34	V	78/80 (98%)	67 (86%)	11 (14%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
35	W	81/83 (98%)	75 (93%)	6 (7%)	0	100	100
36	X	114/116 (98%)	100 (88%)	14 (12%)	0	100	100
37	Y	139/141 (99%)	121 (87%)	18 (13%)	0	100	100
38	Z	28/30 (93%)	27 (96%)	1 (4%)	0	100	100
40	b	74/76 (97%)	67 (90%)	7 (10%)	0	100	100
41	c	75/77 (97%)	69 (92%)	6 (8%)	0	100	100
43	e	60/62 (97%)	58 (97%)	2 (3%)	0	100	100
44	f	56/58 (97%)	51 (91%)	5 (9%)	0	100	100
45	g	64/66 (97%)	58 (91%)	6 (9%)	0	100	100
46	h	269/271 (99%)	241 (90%)	28 (10%)	0	100	100
47	i	54/56 (96%)	49 (91%)	5 (9%)	0	100	100
48	j	207/209 (99%)	188 (91%)	19 (9%)	0	100	100
49	k	50/52 (96%)	48 (96%)	2 (4%)	0	100	100
50	l	199/201 (99%)	184 (92%)	15 (8%)	0	100	100
51	m	44/46 (96%)	43 (98%)	1 (2%)	0	100	100
52	n	175/177 (99%)	161 (92%)	14 (8%)	0	100	100
53	o	62/64 (97%)	54 (87%)	7 (11%)	1 (2%)	8	37
54	p	173/175 (99%)	156 (90%)	16 (9%)	1 (1%)	22	54
55	q	36/38 (95%)	33 (92%)	3 (8%)	0	100	100
56	r	147/149 (99%)	136 (92%)	11 (8%)	0	100	100
57	s	140/142 (99%)	127 (91%)	13 (9%)	0	100	100
58	t	121/123 (98%)	108 (89%)	13 (11%)	0	100	100
59	u	142/144 (99%)	132 (93%)	10 (7%)	0	100	100
60	v	134/136 (98%)	121 (90%)	13 (10%)	0	100	100
61	w	117/119 (98%)	109 (93%)	8 (7%)	0	100	100
62	x	114/116 (98%)	110 (96%)	4 (4%)	0	100	100
63	y	112/114 (98%)	104 (93%)	8 (7%)	0	100	100
64	z	115/117 (98%)	107 (93%)	8 (7%)	0	100	100
All	All	9368/9974 (94%)	8467 (90%)	836 (9%)	65 (1%)	21	51

All (65) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
11	AA	596	ASP
11	AA	853	ASP
11	AA	859	GLU
11	AA	862	LEU
11	AA	873	ILE
11	AA	937	ASP
11	AA	993	PRO
20	H	76	GLU
20	H	139	ARG
20	H	153	GLU
20	H	169	SER
20	H	306	VAL
20	H	340	ARG
31	S	96	LEU
11	AA	375	PRO
11	AA	856	ASN
11	AA	870	ILE
11	AA	940	GLU
11	AA	985	GLU
11	AA	1003	THR
11	AA	1158	LYS
14	AE	175	GLU
20	H	108	VAL
20	H	309	MET
20	H	333	LEU
53	o	32	ILE
11	AA	376	PRO
11	AA	723	VAL
11	AA	728	ASP
11	AA	935	THR
11	AA	980	VAL
11	AA	1005	GLU
11	AA	1045	GLY
13	AC	164	ASP
13	AC	165	GLU
14	AE	51	PRO
14	AE	805	GLN
20	H	78	GLY
20	H	142	ARG
28	P	58	ASN
30	R	45	PRO
11	AA	850	ILE
11	AA	943	LYS

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Mol	Chain	Res	Type
11	AA	995	ASP
14	AE	174	ASP
14	AE	193	ASP
21	I	80	LYS
54	p	48	ASN
9	9	79	PRO
11	AA	917	SER
11	AA	991	LYS
11	AA	997	TRP
11	AA	1044	PRO
14	AE	91	GLU
15	C	41	PRO
20	H	70	VAL
14	AE	49	PHE
14	AE	73	GLY
14	AE	904	ALA
23	K	91	GLY
11	AA	697	LYS
11	AA	1159	VAL
11	AA	1317	PRO
4	3	55	PRO
11	AA	933	VAL

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	84/84 (100%)	84 (100%)	0	100 100
2	1	93/93 (100%)	93 (100%)	0	100 100
3	2	81/81 (100%)	81 (100%)	0	100 100
4	3	84/84 (100%)	84 (100%)	0	100 100
5	4	78/78 (100%)	78 (100%)	0	100 100
9	9	112/112 (100%)	111 (99%)	1 (1%)	75 84
11	AA	1140/1157 (98%)	1039 (91%)	101 (9%)	8 31

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
12	AB	86/158 (54%)	84 (98%)	2 (2%)	45 64
13	AC	198/198 (100%)	182 (92%)	16 (8%)	9 34
13	AD	196/198 (99%)	194 (99%)	2 (1%)	73 82
14	AE	1120/1168 (96%)	1051 (94%)	69 (6%)	15 42
15	C	57/57 (100%)	53 (93%)	4 (7%)	12 39
17	E	65/65 (100%)	65 (100%)	0	100 100
18	F	60/60 (100%)	58 (97%)	2 (3%)	33 57
19	G	187/187 (100%)	183 (98%)	4 (2%)	48 67
20	H	137/461 (30%)	125 (91%)	12 (9%)	8 32
21	I	171/171 (100%)	164 (96%)	7 (4%)	26 52
22	J	172/172 (100%)	163 (95%)	9 (5%)	19 46
23	K	119/119 (100%)	118 (99%)	1 (1%)	79 85
24	L	91/91 (100%)	91 (100%)	0	100 100
25	M	124/124 (100%)	124 (100%)	0	100 100
26	N	104/104 (100%)	104 (100%)	0	100 100
27	O	105/105 (100%)	103 (98%)	2 (2%)	52 70
28	P	86/86 (100%)	77 (90%)	9 (10%)	5 25
29	Q	90/90 (100%)	90 (100%)	0	100 100
30	R	101/104 (97%)	101 (100%)	0	100 100
31	S	83/83 (100%)	80 (96%)	3 (4%)	30 55
32	T	76/76 (100%)	76 (100%)	0	100 100
33	U	65/65 (100%)	65 (100%)	0	100 100
34	V	74/74 (100%)	73 (99%)	1 (1%)	62 76
35	W	72/72 (100%)	72 (100%)	0	100 100
36	X	94/94 (100%)	94 (100%)	0	100 100
37	Y	109/109 (100%)	108 (99%)	1 (1%)	75 84
38	Z	26/26 (100%)	26 (100%)	0	100 100
40	b	58/58 (100%)	57 (98%)	1 (2%)	56 73
41	c	67/67 (100%)	67 (100%)	0	100 100
43	e	54/54 (100%)	54 (100%)	0	100 100
44	f	48/48 (100%)	48 (100%)	0	100 100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
45	g	59/59 (100%)	58 (98%)	1 (2%)	56 73
46	h	216/216 (100%)	216 (100%)	0	100 100
47	i	47/47 (100%)	46 (98%)	1 (2%)	48 67
48	j	164/164 (100%)	163 (99%)	1 (1%)	84 90
49	k	47/47 (100%)	47 (100%)	0	100 100
50	l	165/165 (100%)	163 (99%)	2 (1%)	67 79
51	m	38/38 (100%)	35 (92%)	3 (8%)	10 36
52	n	148/148 (100%)	148 (100%)	0	100 100
53	o	51/51 (100%)	51 (100%)	0	100 100
54	p	136/136 (100%)	136 (100%)	0	100 100
55	q	34/34 (100%)	34 (100%)	0	100 100
56	r	114/114 (100%)	114 (100%)	0	100 100
57	s	116/116 (100%)	116 (100%)	0	100 100
58	t	104/104 (100%)	104 (100%)	0	100 100
59	u	103/103 (100%)	103 (100%)	0	100 100
60	v	109/109 (100%)	107 (98%)	2 (2%)	54 71
61	w	99/99 (100%)	98 (99%)	1 (1%)	73 82
62	x	86/86 (100%)	86 (100%)	0	100 100
63	y	99/99 (100%)	98 (99%)	1 (1%)	73 82
64	z	89/89 (100%)	89 (100%)	0	100 100
All	All	7791/8257 (94%)	7532 (97%)	259 (3%)	35 57

All (259) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
9	9	125	ARG
11	AA	376	PRO
11	AA	723	VAL
11	AA	728	ASP
11	AA	731	ARG
11	AA	752	ASN
11	AA	817	LEU
11	AA	840	SER
11	AA	844	LYS
11	AA	845	LEU

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Mol	Chain	Res	Type
11	AA	851	THR
11	AA	854	ILE
11	AA	855	PRO
11	AA	857	VAL
11	AA	862	LEU
11	AA	864	LYS
11	AA	865	LEU
11	AA	866	ASP
11	AA	867	GLU
11	AA	868	SER
11	AA	871	VAL
11	AA	873	ILE
11	AA	876	GLU
11	AA	884	VAL
11	AA	886	LYS
11	AA	890	LYS
11	AA	912	ASP
11	AA	913	VAL
11	AA	914	LYS
11	AA	918	LEU
11	AA	933	VAL
11	AA	936	ARG
11	AA	939	VAL
11	AA	941	LYS
11	AA	943	LYS
11	AA	944	ARG
11	AA	949	GLU
11	AA	950	GLU
11	AA	951	MET
11	AA	952	GLN
11	AA	953	LEU
11	AA	954	LYS
11	AA	955	GLN
11	AA	957	LYS
11	AA	958	LYS
11	AA	959	ASP
11	AA	960	LEU
11	AA	962	GLU
11	AA	963	GLU
11	AA	964	LEU
11	AA	965	GLN
11	AA	967	LEU

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Mol	Chain	Res	Type
11	AA	968	GLU
11	AA	971	LEU
11	AA	973	SER
11	AA	974	ARG
11	AA	979	LEU
11	AA	980	VAL
11	AA	985	GLU
11	AA	988	LYS
11	AA	989	LEU
11	AA	991	LYS
11	AA	992	LEU
11	AA	994	ARG
11	AA	995	ASP
11	AA	997	TRP
11	AA	998	LEU
11	AA	999	GLU
11	AA	1002	LEU
11	AA	1005	GLU
11	AA	1006	GLU
11	AA	1007	LYS
11	AA	1008	GLN
11	AA	1009	ASN
11	AA	1010	GLN
11	AA	1013	GLN
11	AA	1019	ASP
11	AA	1020	GLU
11	AA	1022	LYS
11	AA	1023	HIS
11	AA	1024	GLU
11	AA	1025	PHE
11	AA	1026	GLU
11	AA	1027	LYS
11	AA	1029	LEU
11	AA	1032	LYS
11	AA	1034	ARG
11	AA	1035	LYS
11	AA	1038	GLN
11	AA	1041	ASP
11	AA	1042	LEU
11	AA	1046	VAL
11	AA	1047	LEU
11	AA	1048	LYS

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Mol	Chain	Res	Type
11	AA	1151	LEU
11	AA	1159	VAL
11	AA	1250	SER
11	AA	1252	SER
11	AA	1253	LEU
11	AA	1254	VAL
11	AA	1256	GLN
11	AA	1259	LEU
12	AB	21	ARG
12	AB	47	GLU
13	AC	12	ARG
13	AC	62	ASP
13	AC	65	LEU
13	AC	72	GLU
13	AC	91	ARG
13	AC	134	THR
13	AC	158	ARG
13	AC	159	ILE
13	AC	160	HIS
13	AC	162	GLU
13	AC	163	GLU
13	AC	165	GLU
13	AC	166	ARG
13	AC	168	ILE
13	AC	170	ARG
13	AC	171	LEU
13	AD	12	ARG
13	AD	208	ASN
14	AE	40	LYS
14	AE	42	GLU
14	AE	44	ILE
14	AE	46	TYR
14	AE	47	ARG
14	AE	49	PHE
14	AE	50	LYS
14	AE	52	GLU
14	AE	53	ARG
14	AE	54	ASP
14	AE	60	ARG
14	AE	67	ASP
14	AE	70	CYS
14	AE	72	CYS

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Mol	Chain	Res	Type
14	AE	74	LYS
14	AE	76	LYS
14	AE	77	ARG
14	AE	78	LEU
14	AE	81	ARG
14	AE	87	LYS
14	AE	88	CYS
14	AE	91	GLU
14	AE	94	GLN
14	AE	95	THR
14	AE	99	ARG
14	AE	100	GLU
14	AE	117	LEU
14	AE	119	SER
14	AE	123	ARG
14	AE	132	LEU
14	AE	135	ILE
14	AE	142	GLU
14	AE	144	TYR
14	AE	145	VAL
14	AE	147	ILE
14	AE	152	THR
14	AE	154	LEU
14	AE	157	GLN
14	AE	159	ILE
14	AE	175	GLU
14	AE	180	MET
14	AE	190	LYS
14	AE	193	ASP
14	AE	196	GLN
14	AE	210	SER
14	AE	215	LYS
14	AE	216	LYS
14	AE	222	LYS
14	AE	223	LEU
14	AE	227	PHE
14	AE	232	ASN
14	AE	233	LYS
14	AE	237	MET
14	AE	238	ILE
14	AE	239	LEU
14	AE	240	THR

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Mol	Chain	Res	Type
14	AE	244	VAL
14	AE	271	ARG
14	AE	385	LEU
14	AE	386	GLU
14	AE	390	LEU
14	AE	393	THR
14	AE	394	ILE
14	AE	395	LYS
14	AE	514	THR
14	AE	709	ARG
14	AE	836	ARG
14	AE	1172	LYS
14	AE	1373	ARG
15	C	12	ARG
15	C	41	PRO
15	C	43	ARG
15	C	44	ILE
18	F	55	ARG
18	F	66	ARG
19	G	19	GLN
19	G	35	ARG
19	G	74	ARG
19	G	115	LYS
20	H	9	PHE
20	H	54	LYS
20	H	79	PHE
20	H	83	LEU
20	H	268	VAL
20	H	273	ARG
20	H	305	HIS
20	H	336	ASP
20	H	337	GLU
20	H	338	GLU
20	H	339	ARG
20	H	340	ARG
21	I	14	ILE
21	I	75	ILE
21	I	89	LYS
21	I	132	ARG
21	I	164	ARG
21	I	185	ASN
21	I	200	VAL

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Mol	Chain	Res	Type
22	J	47	ARG
22	J	48	LEU
22	J	83	LYS
22	J	95	GLU
22	J	104	ARG
22	J	116	GLN
22	J	138	SER
22	J	143	VAL
22	J	166	GLU
23	K	96	MET
27	O	12	ARG
27	O	106	ARG
28	P	5	ARG
28	P	17	LEU
28	P	24	GLU
28	P	25	ILE
28	P	27	GLU
28	P	37	ARG
28	P	72	ARG
28	P	87	LEU
28	P	89	ARG
31	S	85	ARG
31	S	97	LYS
31	S	98	LYS
34	V	77	ARG
37	Y	102	ARG
40	b	14	ARG
45	g	3	LYS
47	i	52	ARG
48	j	173	GLN
50	l	57	LYS
50	l	163	ASN
51	m	22	MET
51	m	41	ARG
51	m	42	LEU
60	v	10	ARG
60	v	44	ARG
61	w	63	ARG
63	y	75	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (33) such sidechains are listed below:

Mol	Chain	Res	Type
2	1	9	HIS
4	3	69	ASN
11	AA	1236	ASN
15	C	31	ASN
15	C	74	HIS
23	K	70	ASN
27	O	81	HIS
29	Q	40	ASN
31	S	66	GLN
33	U	9	HIS
37	Y	104	GLN
41	c	6	GLN
41	c	34	HIS
43	e	41	HIS
44	f	20	HIS
45	g	6	HIS
46	h	15	HIS
46	h	134	ASN
47	i	4	GLN
47	i	5	GLN
47	i	41	HIS
48	j	173	GLN
49	k	46	HIS
50	l	9	GLN
50	l	62	GLN
51	m	29	GLN
54	p	38	ASN
54	p	115	HIS
56	r	18	GLN
60	v	13	HIS
61	w	73	ASN
64	z	14	HIS
64	z	20	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
10	A	75/76 (98%)	30 (40%)	8 (10%)
10	B	75/76 (98%)	30 (40%)	8 (10%)
16	D	1514/1542 (98%)	304 (20%)	10 (0%)
39	a	2859/2904 (98%)	582 (20%)	0
42	d	119/120 (99%)	19 (15%)	0

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
8	7	28/29 (96%)	18 (64%)	3 (10%)
All	All	4670/4747 (98%)	983 (21%)	29 (0%)

All (983) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
8	7	-6	G
8	7	-5	U
8	7	-4	U
8	7	-2	U
8	7	-1	U
8	7	0	U
8	7	1	U
8	7	2	U
8	7	3	U
8	7	4	U
8	7	5	U
8	7	7	G
8	7	8	A
8	7	9	U
8	7	10	U
8	7	11	U
8	7	12	G
8	7	13	G
10	A	2	G
10	A	6	G
10	A	7	G
10	A	8	U
10	A	10	G
10	A	13	C
10	A	14	A
10	A	15	G
10	A	16	C
10	A	17	C
10	A	18	G
10	A	19	G
10	A	20	U
10	A	21	A
10	A	23	C
10	A	46	G
10	A	47	U
10	A	48	C

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Mol	Chain	Res	Type
10	A	49	G
10	A	52	G
10	A	57	A
10	A	58	A
10	A	59	A
10	A	60	U
10	A	61	C
10	A	66	C
10	A	69	C
10	A	71	C
10	A	73	A
10	A	76	A
10	B	2	G
10	B	6	G
10	B	7	G
10	B	8	U
10	B	10	G
10	B	13	C
10	B	14	A
10	B	15	G
10	B	16	C
10	B	17	C
10	B	18	G
10	B	19	G
10	B	20	U
10	B	21	A
10	B	23	C
10	B	46	G
10	B	47	U
10	B	48	C
10	B	49	G
10	B	52	G
10	B	57	A
10	B	58	A
10	B	59	A
10	B	60	U
10	B	61	C
10	B	66	C
10	B	69	C
10	B	71	C
10	B	73	A
10	B	76	A

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Mol	Chain	Res	Type
16	D	4	U
16	D	5	U
16	D	7	A
16	D	9	G
16	D	15	G
16	D	22	G
16	D	32	A
16	D	37	U
16	D	39	G
16	D	47	C
16	D	48	C
16	D	50	A
16	D	51	A
16	D	52	C
16	D	61	G
16	D	69	G
16	D	71	A
16	D	72	A
16	D	73	C
16	D	74	A
16	D	76	G
16	D	82	G
16	D	83	C
16	D	84	U
16	D	87	C
16	D	94	G
16	D	95	C
16	D	96	U
16	D	108	G
16	D	120	A
16	D	121	U
16	D	122	G
16	D	128	G
16	D	130	A
16	D	131	A
16	D	141	G
16	D	144	G
16	D	150	U
16	D	160	A
16	D	163	C
16	D	173	U
16	D	181	A

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Mol	Chain	Res	Type
16	D	182	A
16	D	189	A
16	D	197	A
16	D	198	G
16	D	202	G
16	D	204	G
16	D	208	U
16	D	210	C
16	D	211	G
16	D	212	G
16	D	216	U
16	D	226	G
16	D	245	U
16	D	246	A
16	D	247	G
16	D	252	U
16	D	253	A
16	D	258	G
16	D	262	A
16	D	266	G
16	D	267	C
16	D	276	G
16	D	279	A
16	D	289	G
16	D	306	A
16	D	316	C
16	D	321	A
16	D	328	C
16	D	329	A
16	D	332	G
16	D	347	G
16	D	351	G
16	D	352	C
16	D	353	A
16	D	354	G
16	D	355	C
16	D	367	U
16	D	372	C
16	D	382	A
16	D	397	A
16	D	406	G
16	D	411	A

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Mol	Chain	Res	Type
16	D	412	A
16	D	413	G
16	D	414	A
16	D	421	U
16	D	422	C
16	D	424	G
16	D	429	U
16	D	430	A
16	D	446	G
16	D	452	A
16	D	457	G
16	D	458	U
16	D	463	U
16	D	464	U
16	D	467	U
16	D	468	A
16	D	469	C
16	D	478	A
16	D	479	U
16	D	481	G
16	D	484	G
16	D	485	U
16	D	486	U
16	D	496	A
16	D	500	G
16	D	505	G
16	D	506	G
16	D	511	C
16	D	515	G
16	D	518	C
16	D	519	C
16	D	521	G
16	D	522	C
16	D	531	U
16	D	532	A
16	D	533	A
16	D	547	A
16	D	559	A
16	D	564	C
16	D	568	G
16	D	572	A
16	D	573	A

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Mol	Chain	Res	Type
16	D	575	G
16	D	576	C
16	D	577	G
16	D	579	A
16	D	596	A
16	D	628	G
16	D	633	G
16	D	650	G
16	D	653	U
16	D	665	A
16	D	687	A
16	D	692	U
16	D	700	G
16	D	723	U
16	D	724	G
16	D	727	G
16	D	731	G
16	D	747	A
16	D	748	G
16	D	759	A
16	D	777	A
16	D	792	A
16	D	793	U
16	D	794	A
16	D	802	A
16	D	815	A
16	D	817	C
16	D	828	U
16	D	829	G
16	D	832	G
16	D	841	C
16	D	844	G
16	D	845	A
16	D	846	G
16	D	849	G
16	D	874	G
16	D	887	G
16	D	889	A
16	D	902	G
16	D	914	A
16	D	916	U
16	D	926	G

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Mol	Chain	Res	Type
16	D	934	C
16	D	935	A
16	D	942	G
16	D	945	G
16	D	958	A
16	D	960	U
16	D	965	U
16	D	969	A
16	D	972	C
16	D	975	A
16	D	976	G
16	D	977	A
16	D	984	C
16	D	992	U
16	D	993	G
16	D	996	A
16	D	1003	G
16	D	1004	A
16	D	1006	G
16	D	1008	U
16	D	1009	U
16	D	1014	A
16	D	1017	U
16	D	1018	G
16	D	1021	A
16	D	1024	G
16	D	1026	G
16	D	1028	C
16	D	1030	U
16	D	1031	C
16	D	1033	G
16	D	1036	A
16	D	1038	C
16	D	1043	G
16	D	1044	A
16	D	1052	U
16	D	1056	U
16	D	1065	U
16	D	1085	U
16	D	1086	U
16	D	1094	G
16	D	1095	U

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Mol	Chain	Res	Type
16	D	1099	G
16	D	1101	A
16	D	1108	G
16	D	1124	G
16	D	1125	U
16	D	1131	G
16	D	1133	G
16	D	1135	U
16	D	1136	C
16	D	1137	C
16	D	1139	G
16	D	1140	C
16	D	1141	C
16	D	1142	G
16	D	1143	G
16	D	1145	A
16	D	1146	A
16	D	1151	A
16	D	1152	A
16	D	1154	G
16	D	1158	C
16	D	1159	U
16	D	1167	A
16	D	1171	A
16	D	1175	G
16	D	1176	A
16	D	1179	A
16	D	1184	G
16	D	1193	G
16	D	1196	A
16	D	1197	A
16	D	1201	A
16	D	1206	G
16	D	1213	A
16	D	1215	G
16	D	1224	U
16	D	1227	A
16	D	1234	C
16	D	1238	A
16	D	1239	A
16	D	1252	A
16	D	1254	A

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Mol	Chain	Res	Type
16	D	1256	A
16	D	1257	A
16	D	1260	G
16	D	1275	A
16	D	1276	G
16	D	1279	G
16	D	1280	A
16	D	1285	A
16	D	1286	U
16	D	1287	A
16	D	1299	A
16	D	1302	C
16	D	1303	C
16	D	1305	G
16	D	1312	G
16	D	1317	C
16	D	1320	C
16	D	1322	C
16	D	1338	G
16	D	1343	G
16	D	1346	A
16	D	1347	G
16	D	1353	G
16	D	1363	A
16	D	1368	A
16	D	1370	G
16	D	1378	C
16	D	1379	G
16	D	1381	U
16	D	1396	A
16	D	1397	C
16	D	1398	A
16	D	1404	C
16	D	1419	G
16	D	1429	A
16	D	1432	G
16	D	1441	A
16	D	1446	A
16	D	1452	C
16	D	1453	G
16	D	1475	G
16	D	1487	G

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Mol	Chain	Res	Type
16	D	1493	A
16	D	1494	G
16	D	1497	G
16	D	1503	A
16	D	1506	U
16	D	1507	A
16	D	1517	G
16	D	1529	G
16	D	1530	G
16	D	1534	A
39	a	4	U
39	a	10	A
39	a	15	G
39	a	28	A
39	a	34	U
39	a	35	G
39	a	46	G
39	a	60	G
39	a	63	A
39	a	71	A
39	a	74	A
39	a	75	G
39	a	80	G
39	a	83	A
39	a	84	A
39	a	85	G
39	a	96	C
39	a	100	U
39	a	101	A
39	a	102	U
39	a	103	A
39	a	114	U
39	a	118	A
39	a	119	A
39	a	120	U
39	a	132	G
39	a	139	U
39	a	142	A
39	a	162	U
39	a	163	C
39	a	181	A
39	a	186	G

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Mol	Chain	Res	Type
39	a	196	A
39	a	199	A
39	a	215	G
39	a	216	A
39	a	222	A
39	a	223	A
39	a	224	U
39	a	225	C
39	a	248	G
39	a	249	C
39	a	250	G
39	a	252	G
39	a	265	A
39	a	266	G
39	a	267	C
39	a	270	A
39	a	271	G
39	a	272	A
39	a	275	C
39	a	276	U
39	a	279	A
39	a	285	G
39	a	292	U
39	a	301	G
39	a	311	A
39	a	317	G
39	a	322	A
39	a	324	A
39	a	329	G
39	a	330	A
39	a	331	C
39	a	338	G
39	a	353	C
39	a	361	G
39	a	362	A
39	a	370	G
39	a	371	A
39	a	372	G
39	a	373	U
39	a	375	G
39	a	386	G
39	a	388	G

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Mol	Chain	Res	Type
39	a	389	G
39	a	396	G
39	a	404	A
39	a	405	U
39	a	411	G
39	a	412	A
39	a	416	U
39	a	420	C
39	a	424	G
39	a	429	A
39	a	451	U
39	a	456	C
39	a	457	A
39	a	461	C
39	a	462	C
39	a	479	A
39	a	480	A
39	a	481	G
39	a	482	A
39	a	483	A
39	a	491	G
39	a	499	U
39	a	501	A
39	a	505	A
39	a	508	A
39	a	509	C
39	a	510	C
39	a	522	A
39	a	529	A
39	a	531	C
39	a	532	A
39	a	533	G
39	a	543	G
39	a	546	U
39	a	547	A
39	a	548	G
39	a	549	G
39	a	551	G
39	a	563	A
39	a	567	U
39	a	569	U
39	a	573	U

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Mol	Chain	Res	Type
39	a	574	A
39	a	575	A
39	a	586	A
39	a	588	U
39	a	594	U
39	a	599	A
39	a	603	A
39	a	608	A
39	a	609	A
39	a	613	A
39	a	614	A
39	a	615	U
39	a	616	A
39	a	621	A
39	a	627	A
39	a	637	A
39	a	640	C
39	a	642	U
39	a	645	C
39	a	646	U
39	a	647	G
39	a	654	A
39	a	655	A
39	a	661	A
39	a	664	G
39	a	668	A
39	a	676	A
39	a	685	A
39	a	686	U
39	a	702	U
39	a	710	U
39	a	717	C
39	a	726	G
39	a	729	G
39	a	730	A
39	a	738	G
39	a	757	G
39	a	764	A
39	a	765	C
39	a	775	G
39	a	776	G
39	a	782	A

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Mol	Chain	Res	Type
39	a	784	G
39	a	785	G
39	a	800	A
39	a	805	G
39	a	812	C
39	a	819	A
39	a	827	U
39	a	828	U
39	a	831	G
39	a	845	A
39	a	846	U
39	a	857	G
39	a	858	G
39	a	859	G
39	a	866	A
39	a	869	G
39	a	878	A
39	a	884	U
39	a	885	C
39	a	887	A
39	a	891	G
39	a	895	U
39	a	896	A
39	a	897	C
39	a	899	A
39	a	910	A
39	a	914	G
39	a	915	C
39	a	931	U
39	a	941	A
39	a	946	C
39	a	953	G
39	a	961	C
39	a	973	A
39	a	974	G
39	a	983	A
39	a	984	A
39	a	994	C
39	a	995	C
39	a	996	A
39	a	999	U
39	a	1012	U

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Mol	Chain	Res	Type
39	a	1013	C
39	a	1022	G
39	a	1023	U
39	a	1026	G
39	a	1033	U
39	a	1041	G
39	a	1045	C
39	a	1046	A
39	a	1047	G
39	a	1060	U
39	a	1062	G
39	a	1064	C
39	a	1066	U
39	a	1067	A
39	a	1068	G
39	a	1070	A
39	a	1071	G
39	a	1073	A
39	a	1074	G
39	a	1079	C
39	a	1081	U
39	a	1083	U
39	a	1084	A
39	a	1087	G
39	a	1088	A
39	a	1101	U
39	a	1107	G
39	a	1111	A
39	a	1112	G
39	a	1119	U
39	a	1122	G
39	a	1129	A
39	a	1130	U
39	a	1132	U
39	a	1133	A
39	a	1134	A
39	a	1135	C
39	a	1136	G
39	a	1141	U
39	a	1142	A
39	a	1169	A
39	a	1170	C

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Mol	Chain	Res	Type
39	a	1173	U
39	a	1174	U
39	a	1175	A
39	a	1176	U
39	a	1177	G
39	a	1178	C
39	a	1179	G
39	a	1180	U
39	a	1186	G
39	a	1210	G
39	a	1227	G
39	a	1236	G
39	a	1238	G
39	a	1248	G
39	a	1249	U
39	a	1253	A
39	a	1255	U
39	a	1256	G
39	a	1265	A
39	a	1266	G
39	a	1271	G
39	a	1272	A
39	a	1273	U
39	a	1284	A
39	a	1300	G
39	a	1301	A
39	a	1329	U
39	a	1344	U
39	a	1345	C
39	a	1352	U
39	a	1359	A
39	a	1365	A
39	a	1368	G
39	a	1378	A
39	a	1379	U
39	a	1380	G
39	a	1383	A
39	a	1392	A
39	a	1395	A
39	a	1406	U
39	a	1408	G
39	a	1409	U

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Mol	Chain	Res	Type
39	a	1416	G
39	a	1417	C
39	a	1419	A
39	a	1420	A
39	a	1427	A
39	a	1428	C
39	a	1452	G
39	a	1453	A
39	a	1459	G
39	a	1460	U
39	a	1478	G
39	a	1482	G
39	a	1490	A
39	a	1491	G
39	a	1493	C
39	a	1497	U
39	a	1502	A
39	a	1503	A
39	a	1508	A
39	a	1509	A
39	a	1510	G
39	a	1515	A
39	a	1526	C
39	a	1529	G
39	a	1534	U
39	a	1535	A
39	a	1536	C
39	a	1537	G
39	a	1554	U
39	a	1566	A
39	a	1569	A
39	a	1578	U
39	a	1580	A
39	a	1581	G
39	a	1583	A
39	a	1589	U
39	a	1590	A
39	a	1607	C
39	a	1608	A
39	a	1610	A
39	a	1613	G
39	a	1616	A

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Mol	Chain	Res	Type
39	a	1622	G
39	a	1634	A
39	a	1646	C
39	a	1647	U
39	a	1648	U
39	a	1649	G
39	a	1651	G
39	a	1659	G
39	a	1665	A
39	a	1668	A
39	a	1674	G
39	a	1713	A
39	a	1714	U
39	a	1715	G
39	a	1722	A
39	a	1729	U
39	a	1730	C
39	a	1732	C
39	a	1738	G
39	a	1754	A
39	a	1764	C
39	a	1773	A
39	a	1787	A
39	a	1791	A
39	a	1799	G
39	a	1800	C
39	a	1801	A
39	a	1808	A
39	a	1816	C
39	a	1829	A
39	a	1833	C
39	a	1841	U
39	a	1847	A
39	a	1848	A
39	a	1858	A
39	a	1859	U
39	a	1863	G
39	a	1864	U
39	a	1869	G
39	a	1870	C
39	a	1872	A
39	a	1881	C

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Mol	Chain	Res	Type
39	a	1889	A
39	a	1907	G
39	a	1913	A
39	a	1914	C
39	a	1919	A
39	a	1920	C
39	a	1922	G
39	a	1923	U
39	a	1925	C
39	a	1926	U
39	a	1929	G
39	a	1930	G
39	a	1938	A
39	a	1955	U
39	a	1960	A
39	a	1965	C
39	a	1967	C
39	a	1970	A
39	a	1971	U
39	a	1972	G
39	a	1976	U
39	a	1987	A
39	a	1991	U
39	a	1992	G
39	a	1993	U
39	a	1997	C
39	a	2018	G
39	a	2020	A
39	a	2021	C
39	a	2022	U
39	a	2023	C
39	a	2027	G
39	a	2033	A
39	a	2043	C
39	a	2052	A
39	a	2055	C
39	a	2056	G
39	a	2057	G
39	a	2060	A
39	a	2061	G
39	a	2062	A
39	a	2072	C

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Mol	Chain	Res	Type
39	a	2080	A
39	a	2097	A
39	a	2099	U
39	a	2100	G
39	a	2107	G
39	a	2108	A
39	a	2110	G
39	a	2111	U
39	a	2112	G
39	a	2113	U
39	a	2115	G
39	a	2116	G
39	a	2117	A
39	a	2118	U
39	a	2121	G
39	a	2122	U
39	a	2124	G
39	a	2125	G
39	a	2126	A
39	a	2127	G
39	a	2128	G
39	a	2131	U
39	a	2132	U
39	a	2133	G
39	a	2134	A
39	a	2139	U
39	a	2146	C
39	a	2147	A
39	a	2154	A
39	a	2157	G
39	a	2158	A
39	a	2159	G
39	a	2161	C
39	a	2162	G
39	a	2163	A
39	a	2164	C
39	a	2165	C
39	a	2171	A
39	a	2172	U
39	a	2176	A
39	a	2182	U
39	a	2183	A

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Mol	Chain	Res	Type
39	a	2189	U
39	a	2190	G
39	a	2193	G
39	a	2194	U
39	a	2198	A
39	a	2203	U
39	a	2204	G
39	a	2211	A
39	a	2212	A
39	a	2225	A
39	a	2226	C
39	a	2229	U
39	a	2231	U
39	a	2238	G
39	a	2239	G
39	a	2243	U
39	a	2250	G
39	a	2273	A
39	a	2278	A
39	a	2283	C
39	a	2287	A
39	a	2288	A
39	a	2297	A
39	a	2305	U
39	a	2309	A
39	a	2322	A
39	a	2325	G
39	a	2327	A
39	a	2333	A
39	a	2335	A
39	a	2339	C
39	a	2344	U
39	a	2345	G
39	a	2347	C
39	a	2350	C
39	a	2361	G
39	a	2372	U
39	a	2376	A
39	a	2383	G
39	a	2385	C
39	a	2395	C
39	a	2396	G

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Mol	Chain	Res	Type
39	a	2402	U
39	a	2403	C
39	a	2419	U
39	a	2423	U
39	a	2424	C
39	a	2425	A
39	a	2426	A
39	a	2428	G
39	a	2429	G
39	a	2430	A
39	a	2431	U
39	a	2435	A
39	a	2441	U
39	a	2448	A
39	a	2459	A
39	a	2463	C
39	a	2470	G
39	a	2474	U
39	a	2476	A
39	a	2478	A
39	a	2484	G
39	a	2491	U
39	a	2493	U
39	a	2494	G
39	a	2502	G
39	a	2506	U
39	a	2513	A
39	a	2518	A
39	a	2520	C
39	a	2525	G
39	a	2529	G
39	a	2534	A
39	a	2535	G
39	a	2547	A
39	a	2554	U
39	a	2564	A
39	a	2566	A
39	a	2567	G
39	a	2572	A
39	a	2574	G
39	a	2576	G
39	a	2582	G

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Mol	Chain	Res	Type
39	a	2585	U
39	a	2589	A
39	a	2602	A
39	a	2603	G
39	a	2609	U
39	a	2613	U
39	a	2621	G
39	a	2629	U
39	a	2630	G
39	a	2671	G
39	a	2689	U
39	a	2690	U
39	a	2694	G
39	a	2714	G
39	a	2716	C
39	a	2725	A
39	a	2726	A
39	a	2729	G
39	a	2733	A
39	a	2739	U
39	a	2744	G
39	a	2748	A
39	a	2755	C
39	a	2757	A
39	a	2758	A
39	a	2777	G
39	a	2778	A
39	a	2791	G
39	a	2793	C
39	a	2796	U
39	a	2797	U
39	a	2798	U
39	a	2801	G
39	a	2820	A
39	a	2821	A
39	a	2825	G
39	a	2835	A
39	a	2849	U
39	a	2867	G
39	a	2872	A
39	a	2873	A
39	a	2880	C

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Mol	Chain	Res	Type
39	a	2884	U
39	a	2885	G
39	a	2891	U
39	a	2893	A
42	d	2	G
42	d	13	G
42	d	15	A
42	d	16	G
42	d	17	C
42	d	24	G
42	d	35	C
42	d	51	G
42	d	56	G
42	d	57	A
42	d	66	A
42	d	67	G
42	d	68	C
42	d	88	C
42	d	89	U
42	d	90	C
42	d	98	G
42	d	99	A
42	d	109	A

All (29) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
8	7	-5	U
8	7	1	U
8	7	11	U
10	A	6	G
10	A	9	G
10	A	12	G
10	A	22	G
10	A	46	G
10	A	48	C
10	A	57	A
10	A	60	U
10	B	6	G
10	B	9	G
10	B	12	G
10	B	22	G

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Mol	Chain	Res	Type
10	B	46	G
10	B	48	C
10	B	57	A
10	B	60	U
16	D	197	A
16	D	428	G
16	D	496	A
16	D	758	C
16	D	873	A
16	D	992	U
16	D	1109	C
16	D	1145	A
16	D	1492	A
16	D	1493	A

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 3 ligands modelled in this entry, 3 are 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 (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

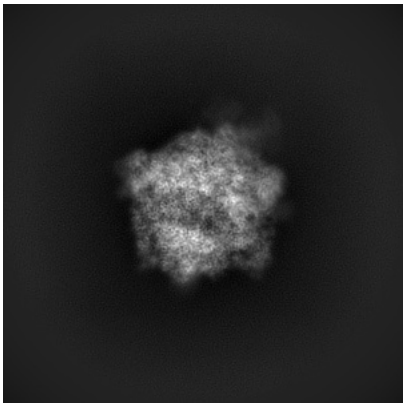
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-21386. These allow visual inspection of the internal detail of the map and identification of artifacts.

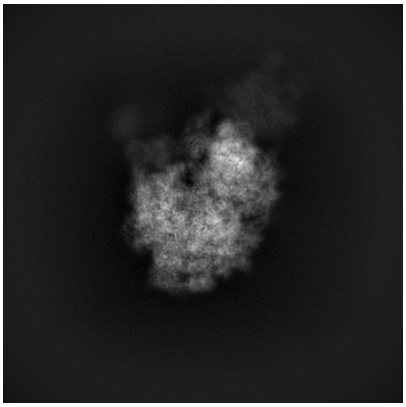
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

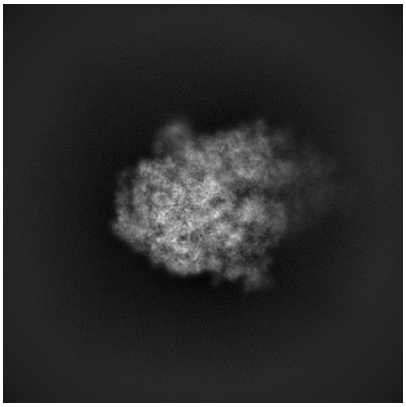
6.1.1 Primary map



X



Y

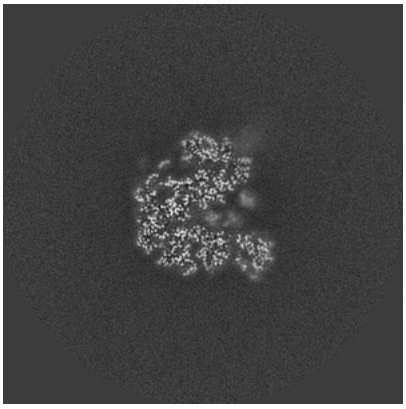


Z

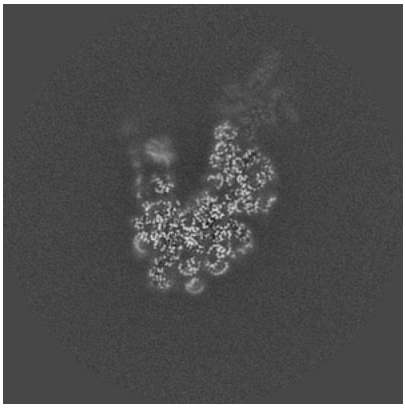
The images above show the map projected in three orthogonal directions.

6.2 Central slices

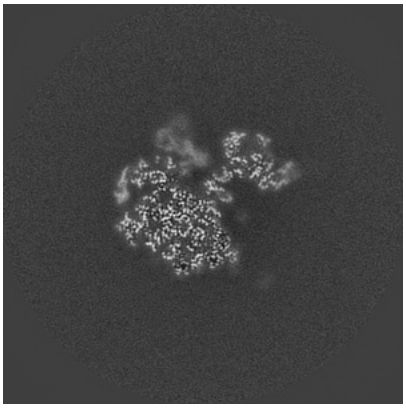
6.2.1 Primary map



X Index: 250



Y Index: 250

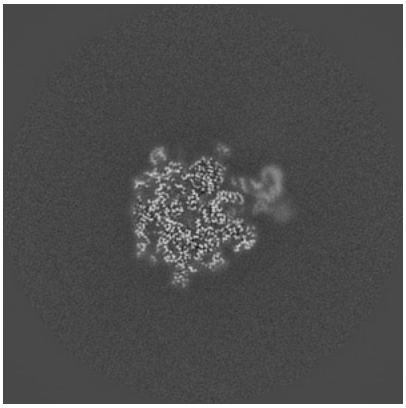


Z Index: 250

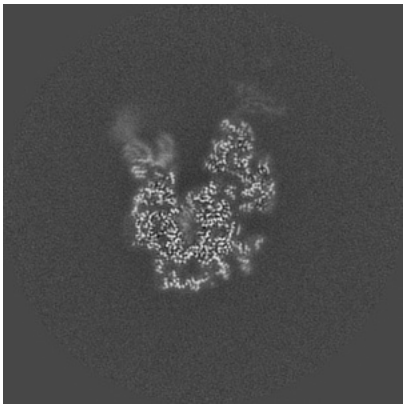
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

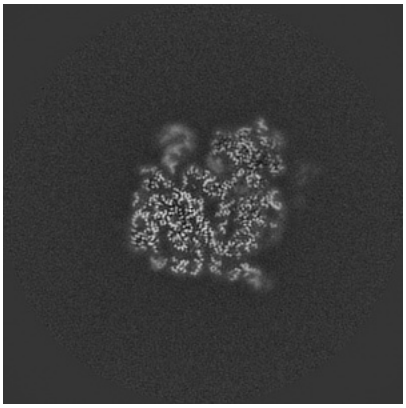
6.3.1 Primary map



X Index: 215



Y Index: 233

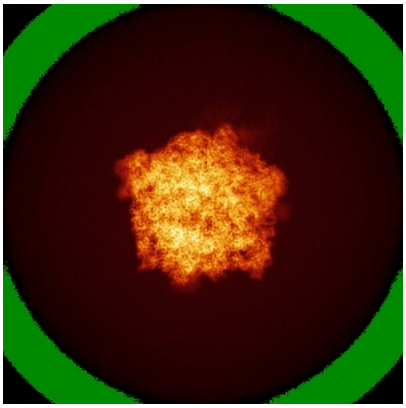


Z Index: 271

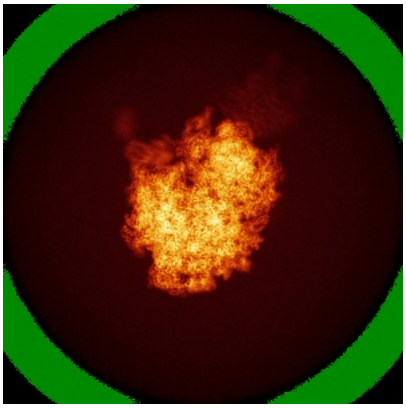
The images above show the largest variance slices of the map in three orthogonal directions.

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

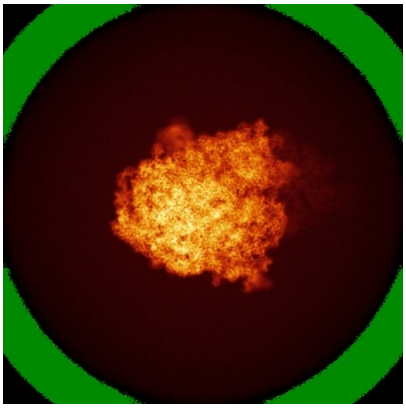
6.4.1 Primary map



X



Y

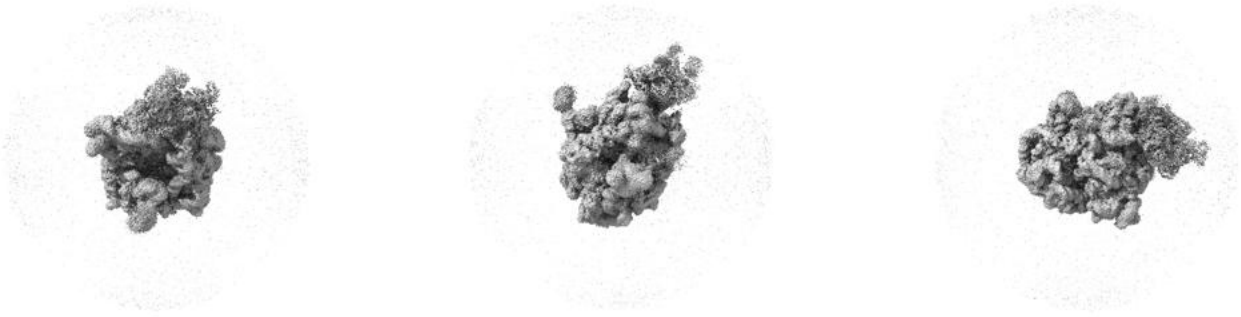


Z

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

6.5 Orthogonal surface views (i)

6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.007. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

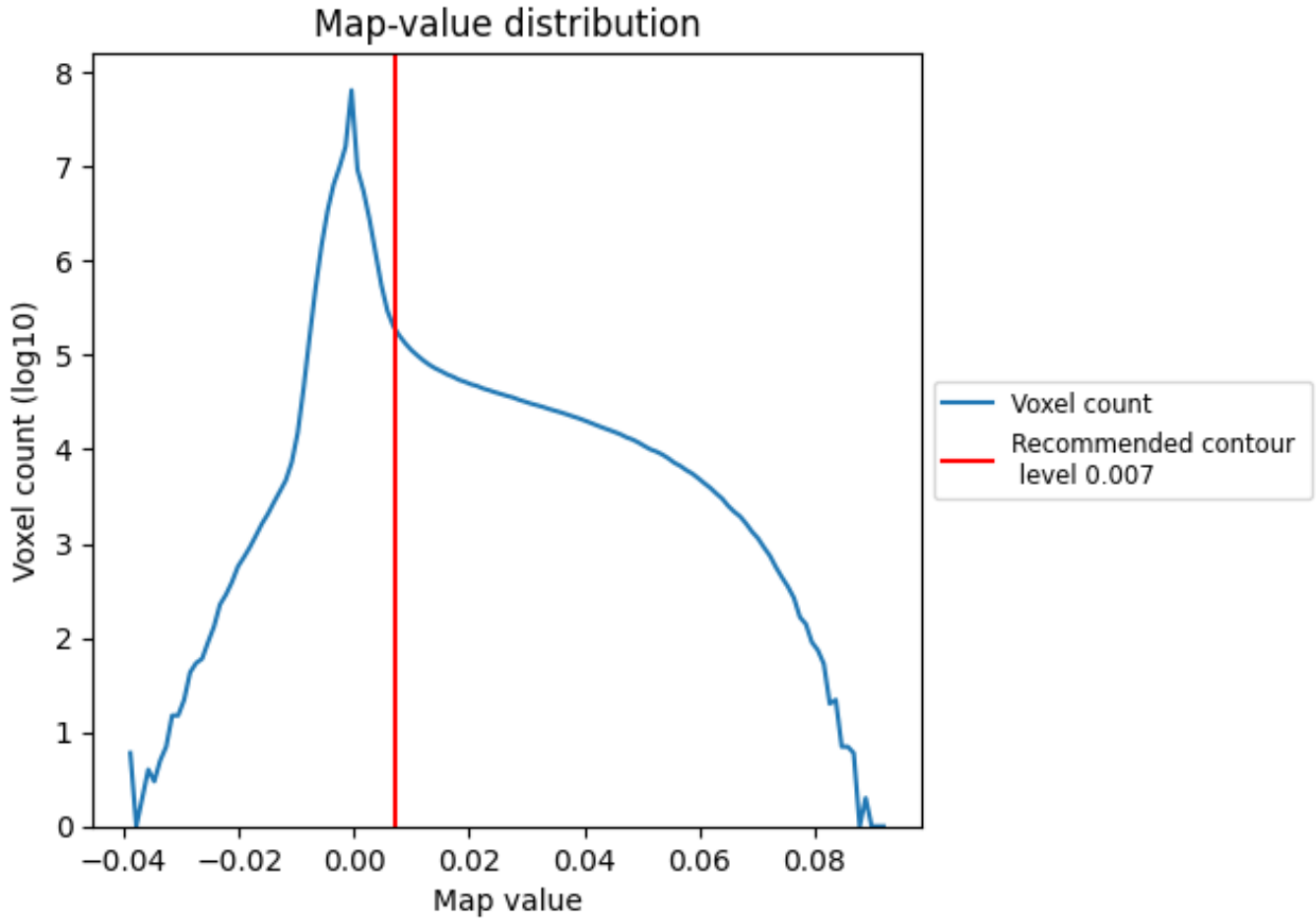
6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis

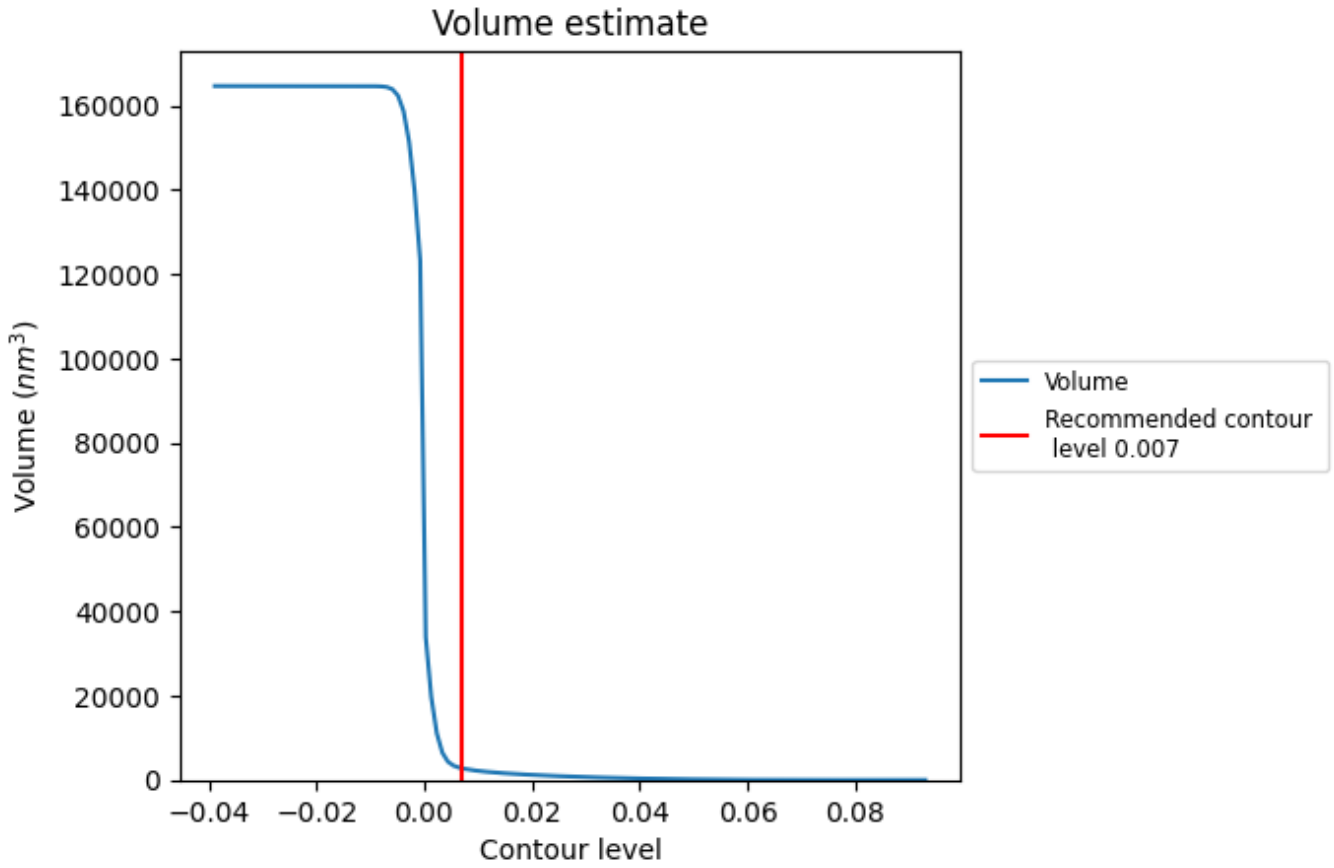
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

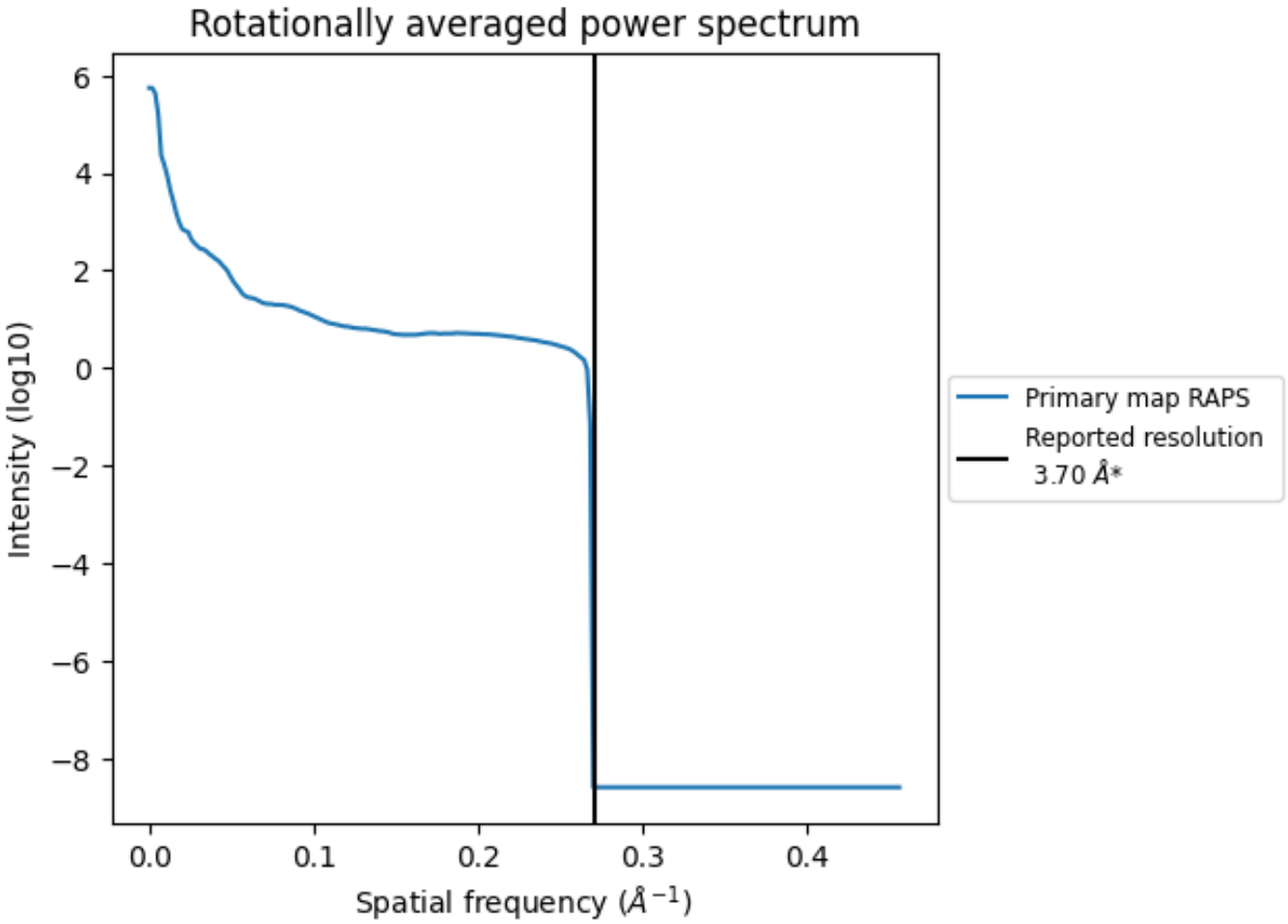
7.2 Volume estimate



The volume at the recommended contour level is 2788 nm^3; this corresponds to an approximate mass of 2518 kDa.

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

7.3 Rotationally averaged power spectrum (i)

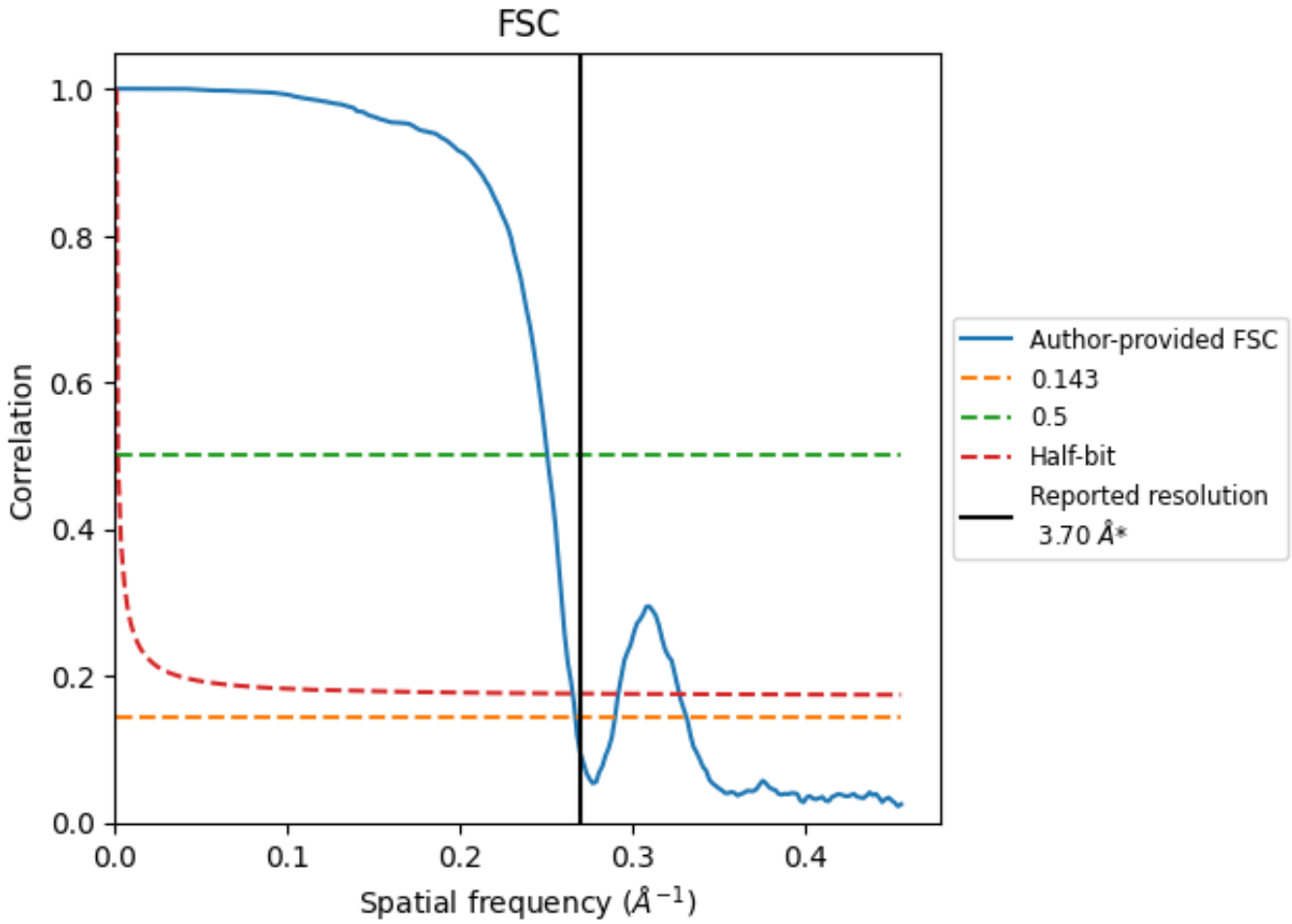


*Reported resolution corresponds to spatial frequency of 0.270 Å^{-1}

8 Fourier-Shell correlation

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

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.270 Å^{-1}

8.2 Resolution estimates (i)

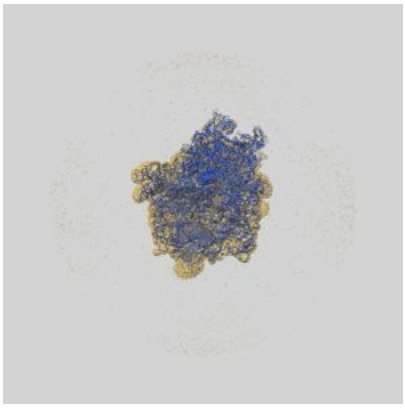
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.70	-	-
Author-provided FSC curve	3.74	3.99	3.77
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

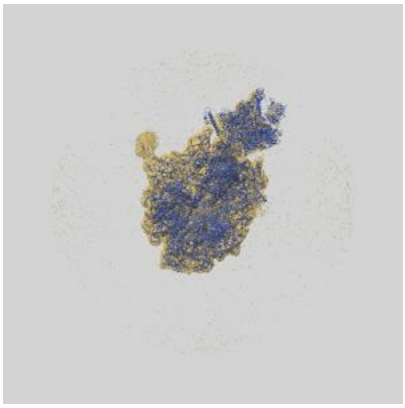
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-21386 and PDB model 6VU3. Per-residue inclusion information can be found in section 3 on page 16.

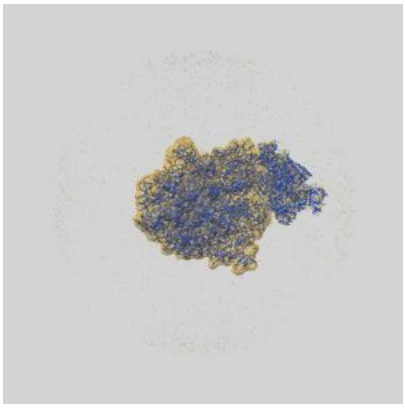
9.1 Map-model overlay



X



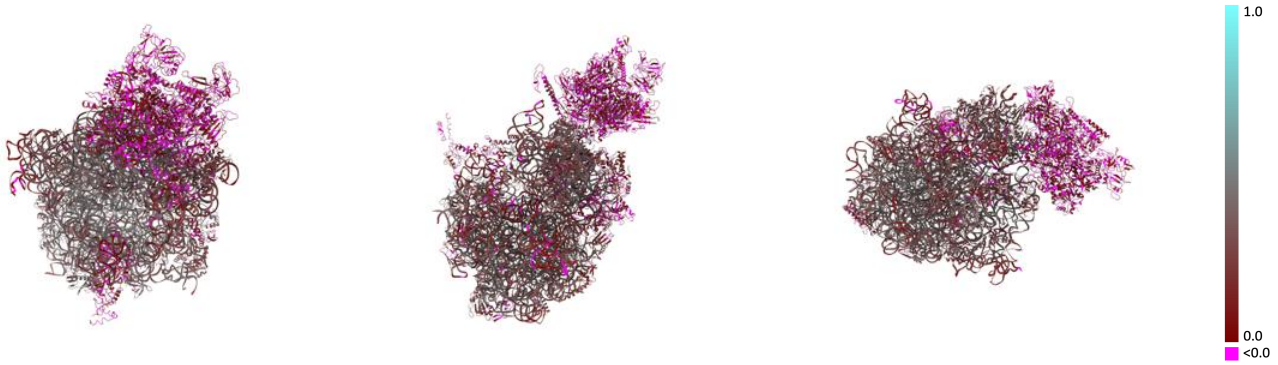
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.007 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

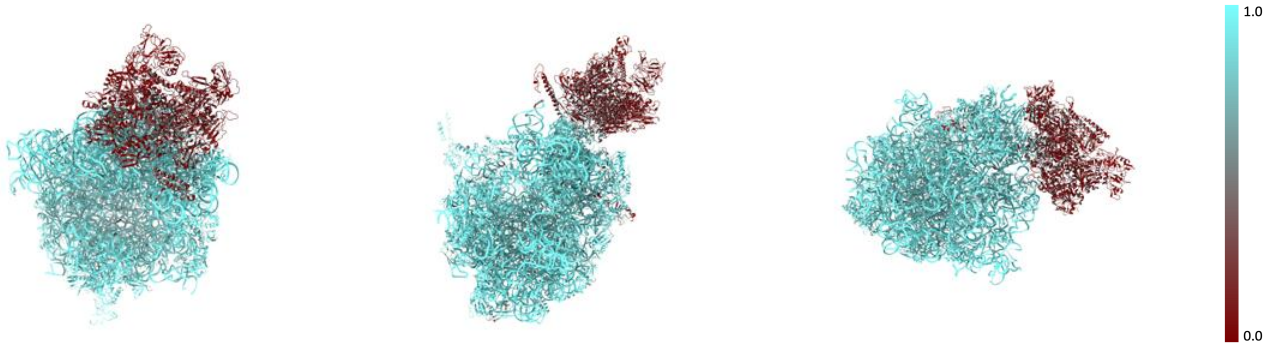
9.2 Q-score mapped to coordinate model



X Y Z

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

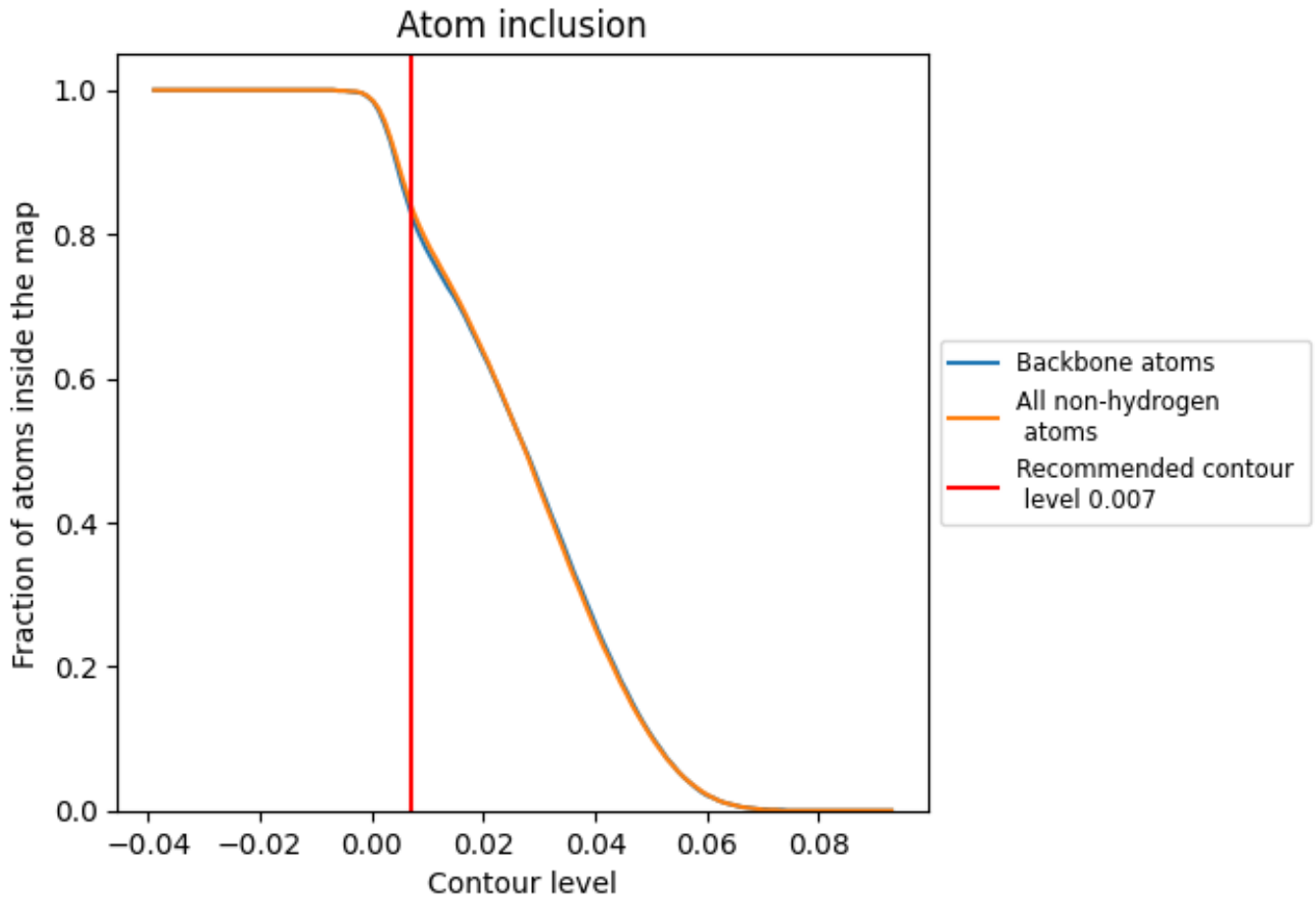
9.3 Atom inclusion mapped to coordinate model



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.007).

9.4 Atom inclusion (i)



At the recommended contour level, 83% of all backbone atoms, 84% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.007) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8420	0.2760
0	0.8630	0.1500
1	0.9110	0.3400
2	0.9110	0.2660
3	0.6280	0.0310
4	0.9420	0.3370
5	0.2100	0.0920
6	0.3360	0.0790
7	0.6430	0.0640
9	0.9420	0.1200
A	0.9890	0.2070
AA	0.2260	0.0620
AB	0.1630	0.1010
AC	0.2250	0.0630
AD	0.1360	0.0640
AE	0.1910	0.0790
B	0.9170	0.1670
C	0.8680	0.1580
D	0.9890	0.3430
E	0.9480	0.3300
F	0.8230	0.0680
G	0.8700	0.1600
H	0.6290	0.0360
I	0.9350	0.3890
J	0.9180	0.2940
K	0.8750	0.1820
L	0.9190	0.2480
M	0.9170	0.2680
N	0.8870	0.2180
O	0.9100	0.1900
P	0.9310	0.3190
Q	0.9030	0.2490
R	0.8880	0.2860
S	0.9110	0.2460
T	0.9130	0.2380

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Chain	Atom inclusion	Q-score
U	0.9280	0.2700
V	0.8810	0.2100
W	0.9460	0.3250
X	0.9290	0.3180
Y	0.8830	0.0510
Z	0.9210	0.0010
a	0.9850	0.3450
b	0.8550	0.1810
c	0.9150	0.3260
d	0.9950	0.3210
e	0.8850	0.1590
f	0.9130	0.3480
g	0.8400	0.0960
h	0.9530	0.4140
i	0.8760	0.2890
j	0.9270	0.3660
k	0.8900	0.2720
l	0.8740	0.2520
m	0.9270	0.3560
n	0.9300	0.2780
o	0.9230	0.3850
p	0.9530	0.3550
q	0.9310	0.3900
r	0.8750	0.2450
s	0.9260	0.3160
t	0.9250	0.3760
u	0.9430	0.3710
v	0.9300	0.3530
w	0.9210	0.2700
x	0.9270	0.2180
y	0.9090	0.2750
z	0.9060	0.2850