Full wwPDB EM Validation Report ⓘ

Mar 6, 2025 – 03:04 pm GMT

PDB ID	:	6YEF
EMDB ID	:	EMD-10791
Title	:	70S initiation complex with assigned rRNA modifications from Staphylococcus aureus
Authors	:	Fatkhullin, B.; Golubev, A.; Khusainov, I.; Yusupova, G.; Yusupov, M.
Deposited on	:	2020-03-24
Resolution	:	3.20 Å(reported)
Based on initial model	:	5LI0

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:

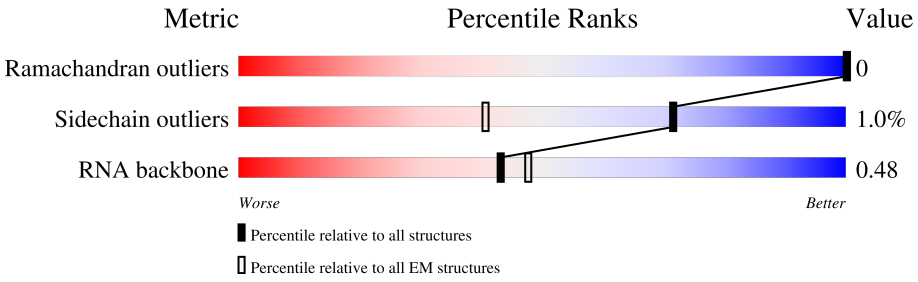
EMDB validation analysis	:	0.0.1.dev117
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.20 Å.

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



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

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

Mol	Chain	Length	Quality of chain
1	a	1556	77% 21%
2	b	255	85% 14%
3	c	217	92% 8%
4	d	200	98%
5	e	166	93% 5%
6	f	98	96%
7	g	156	94% 6%
8	h	132	99%
9	i	132	95%

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Mol	Chain	Length	Quality of chain
10	j	102	96%
11	k	129	87% 12%
12	l	137	98%
13	m	121	96%
14	n	89	67% 33%
15	o	89	99%
16	p	91	99%
17	q	87	97%
18	r	80	80% 20%
19	s	92	85% 11%
20	t	83	96%
21	v	29	45% 24% 28%
22	A	2923	75% 22%
23	B	115	81% 17%
24	D	277	96%
25	E	220	98%
26	F	207	96%
27	G	179	85% 14%
28	H	178	88% 10%
29	M	145	100%
30	N	122	99%
31	O	146	96%
32	P	144	93% 5%
33	Q	122	97%
34	R	119	99%

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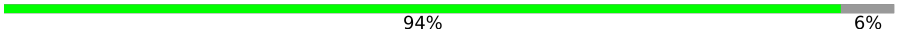
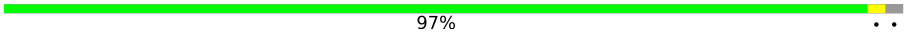
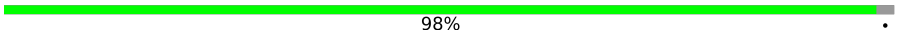
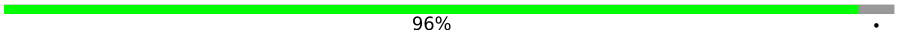
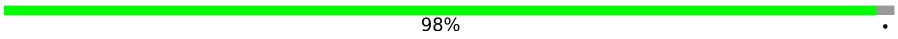
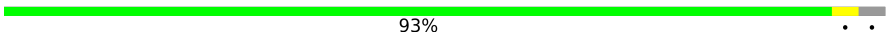
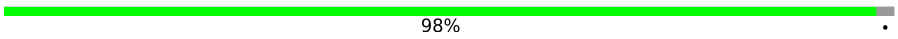
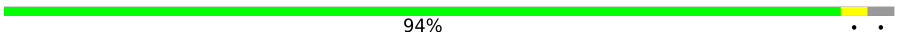
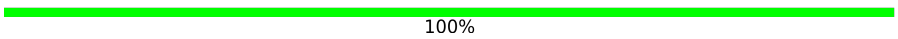
Mol	Chain	Length	Quality of chain
35	S	116	
36	T	118	
37	U	102	
38	V	117	
39	W	91	
40	X	105	
41	Y	217	
42	Z	94	
43	0	62	
44	1	69	
45	2	59	
46	3	84	
47	4	58	
48	5	49	
49	6	45	
50	7	66	
51	8	37	
52	x	77	

2 Entry composition

There are 54 unique types of molecules in this entry. The entry contains 141837 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	a	1545	33097	14781	6034	10737	1545	0	0

- Molecule 2 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	b	219	1762	1123	307	325	7	0	0

- Molecule 3 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	c	200	1578	993	296	287	2	0	0

- Molecule 4 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	d	197	1600	1009	300	289	2	0	0

- Molecule 5 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	e	157	1169	735	214	218	2	0	0

- Molecule 6 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	f	96	798	503	139	153	3	0	0

- Molecule 7 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	g	146	Total	C	N	O	S	0	0
			1176	733	225	214	4		

- Molecule 8 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	h	131	Total	C	N	O	S	0	0
			1032	652	183	193	4		

- Molecule 9 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	i	127	Total	C	N	O	S	0	0
			1008	623	201	183	1		

- Molecule 10 is a protein called ribosomal protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	j	98	Total	C	N	O	S	0	0
			783	494	143	145	1		

- Molecule 11 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	k	113	Total	C	N	O	S	0	0
			833	514	156	160	3		

- Molecule 12 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	l	135	Total	C	N	O	S	0	0
			1058	658	214	184	2		

- Molecule 13 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	m	117	Total	C	N	O	S	0	0
			927	569	184	173	1		

- Molecule 14 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	n	60	Total	C	N	O	S	0	0
			481	296	103	80	2		

- Molecule 15 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	o	88	Total	C	N	O	S	0	0
			738	454	153	130	1		

- Molecule 16 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	p	90	Total	C	N	O	S	0	0
			712	448	132	131	1		

- Molecule 17 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	q	85	Total	C	N	O	S	0	0
			698	441	125	131	1		

- Molecule 18 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	r	64	Total	C	N	O	S	0	0
			527	335	97	92	3		

- Molecule 19 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	s	82	Total	C	N	O	S	0	0
			661	426	118	115	2		

- Molecule 20 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	t	80	Total	C	N	O	S	0	0
			606	367	119	118	2		

- Molecule 21 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	v	21	Total	C	N	O	P	0	0
			462	207	96	138	21		

- Molecule 22 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	A	2881	Total	C	N	O	P	0	0
			61802	27593	11324	20004	2881		

- Molecule 23 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	B	115	Total	C	N	O	P	0	0
			2445	1094	436	801	114		

- Molecule 24 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	D	274	Total	C	N	O	S	0	0
			2094	1303	415	371	5		

- Molecule 25 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	E	216	Total	C	N	O	S	0	0
			1635	1023	301	306	5		

- Molecule 26 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	F	203	Total	C	N	O	S	0	0
			1540	966	284	288	2		

- Molecule 27 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	G	154	Total	C	N	O	S	0	0
			1191	751	206	228	6		

- Molecule 28 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	H	160	Total	C	N	O	S	0	0
			1250	781	222	244	3		

- Molecule 29 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	M	145	Total	C	N	O	S	0	0
			1151	717	211	220	3		

- Molecule 30 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	N	122	Total	C	N	O	S	0	0
			920	572	174	170	4		

- Molecule 31 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	O	146	Total	C	N	O	S	0	0
			1098	680	215	202	1		

- Molecule 32 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	P	137	Total	C	N	O	S	0	0
			1097	704	207	182	4		

- Molecule 33 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	Q	119	Total	C	N	O	S	0	0
			940	575	181	183	1		

- Molecule 34 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms				AltConf	Trace
34	R	118	Total	C	N	O	0	0
			911	568	173	170		

- Molecule 35 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms				AltConf	Trace
35	S	109	Total 877	C 552	N 176	O 149	0	0

- Molecule 36 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	T	116	Total 943	C 593	N 189	O 157	S 4	0	0

- Molecule 37 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	U	100	Total 784	C 497	N 140	O 146	S 1	0	0

- Molecule 38 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	V	112	Total 862	C 537	N 164	O 158	S 3	0	0

- Molecule 39 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	W	89	Total 725	C 457	N 130	O 134	S 4	0	0

- Molecule 40 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	X	87	Total 662	C 420	N 119	O 122	S 1	0	0

- Molecule 41 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	Y	94	Total 731	C 465	N 131	O 133	S 2	0	0

- Molecule 42 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms				AltConf	Trace
42	Z	82	Total 626	C 386	N 122	O 118	0	0

- Molecule 43 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms				AltConf	Trace
43	0	45	Total 358	C 222	N 78	O 58	0	0

- Molecule 44 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms				AltConf	Trace
44	1	65	Total 536	C 330	N 101	O 105	0	0

- Molecule 45 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms				AltConf	Trace
45	2	57	Total 441	C 274	N 83	O 84	0	0

- Molecule 46 is a protein called 50S ribosomal protein L31 type B.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	3	75	Total 593	C 371	N 106	O 113	S 3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
47	4	52	Total 411	C 249	N 85	O 72	S 5	0	0

- Molecule 48 is a protein called 50S ribosomal protein L33 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	5	44	Total 371	C 223	N 76	O 68	S 4	0	0

- Molecule 49 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	6	44	Total	C	N	O	S	0	0
			373	228	90	54	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
50	7	64	Total	C	N	O	S	0	0
			521	324	113	82	2		

- Molecule 51 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	8	37	Total	C	N	O	S	0	0
			296	186	60	46	4		

- Molecule 52 is a RNA chain called P-site tRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
52	x	77	Total	C	N	O	P	S	0	0
			1659	741	299	541	76	2		

- Molecule 53 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
53	a	54	Total	Mg	0
			54	54	
53	v	1	Total	Mg	0
			1	1	
53	A	207	Total	Mg	0
			207	207	
53	B	2	Total	Mg	0
			2	2	
53	D	1	Total	Mg	0
			1	1	
53	O	1	Total	Mg	0
			1	1	
53	X	1	Total	Mg	0
			1	1	
53	x	1	Total	Mg	0
			1	1	

- Molecule 54 is POTASSIUM ION (three-letter code: K) (formula: K).

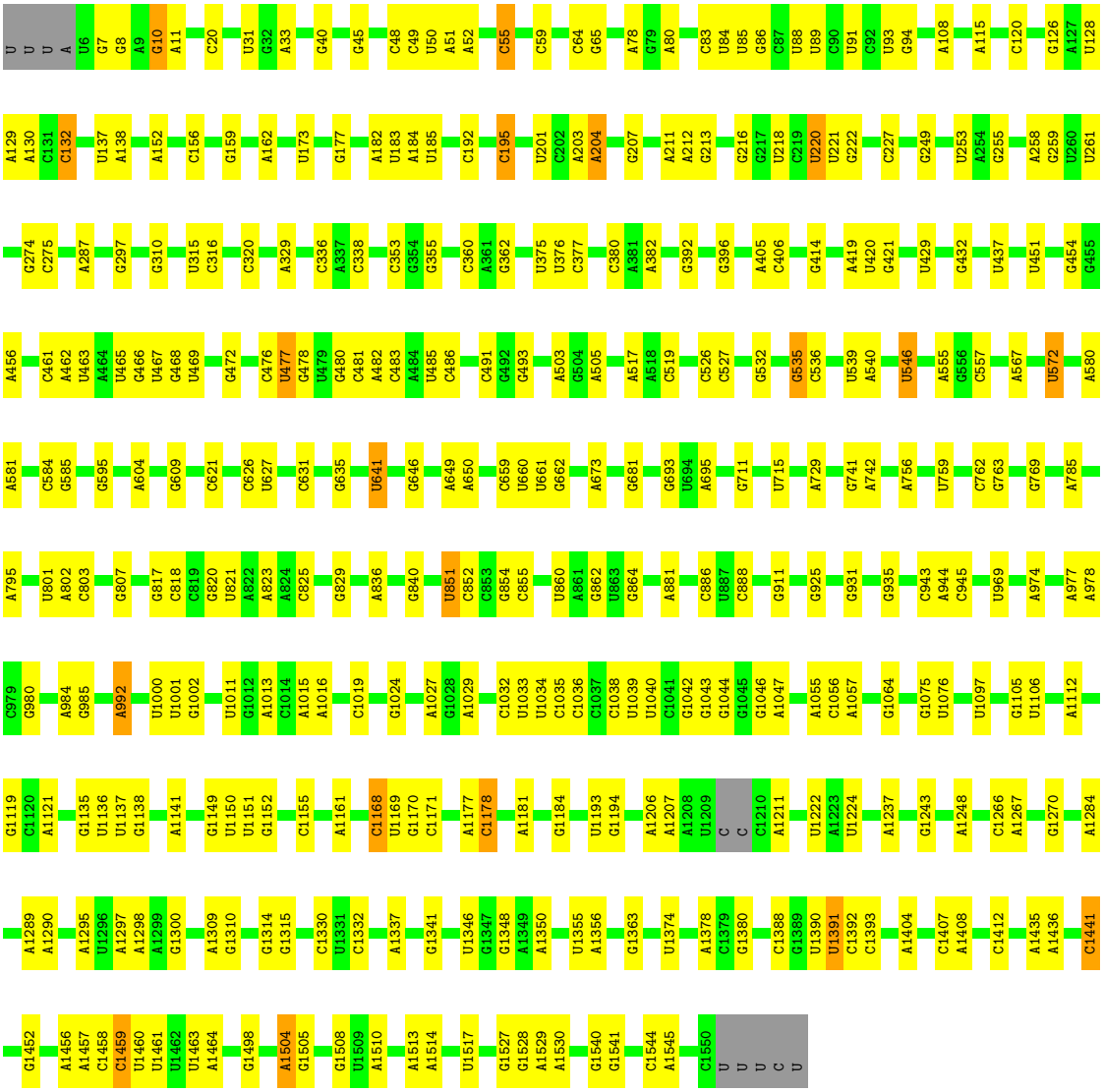
Mol	Chain	Residues	Atoms	AltConf
54	a	2	Total K 2 2	0
54	A	18	Total K 18 18	0

3 Residue-property plots (i)

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

- Molecule 1: 16S rRNA

Chain a:

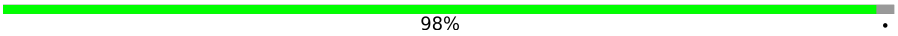


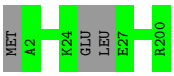
- Molecule 2: 30S ribosomal protein S2

Chain b:

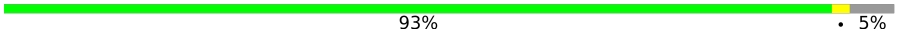
• Molecule 3: 30S ribosomal protein S3

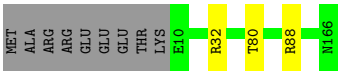
• Molecule 4: 30S ribosomal protein S4



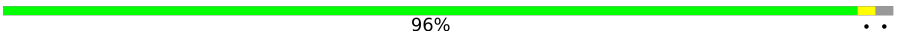


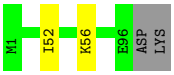
• Molecule 5: 30S ribosomal protein S5



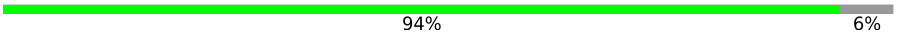


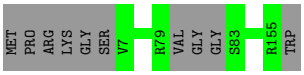
• Molecule 6: 30S ribosomal protein S6



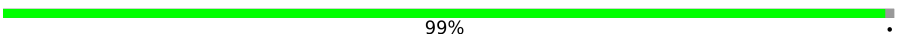


• Molecule 7: 30S ribosomal protein S7

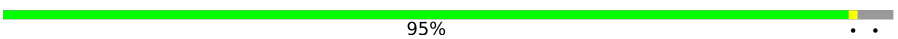


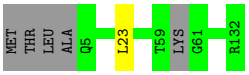


• Molecule 8: 30S ribosomal protein S8



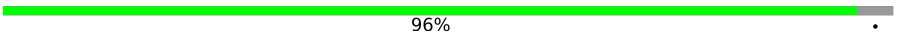
• Molecule 9: 30S ribosomal protein S9

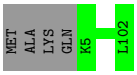




• Molecule 10: ribosomal protein uS10

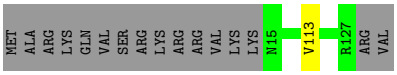
Chain j:





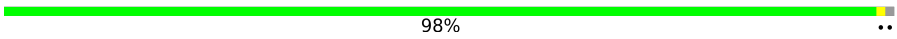
• Molecule 11: 30S ribosomal protein S11

Chain k:



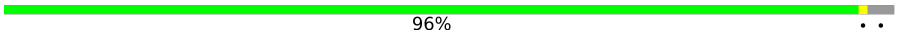
• Molecule 12: 30S ribosomal protein S12

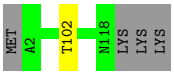
Chain l:



• Molecule 13: 30S ribosomal protein S13

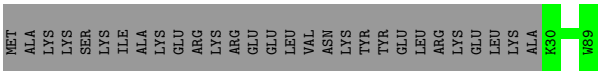
Chain m:





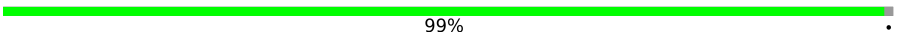
• Molecule 14: 30S ribosomal protein S14

Chain n:



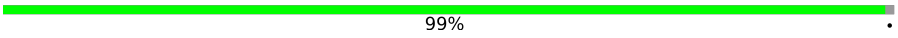
• Molecule 15: 30S ribosomal protein S15

Chain o:



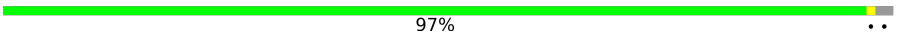
• Molecule 16: 30S ribosomal protein S16

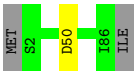
Chain p:



• Molecule 17: 30S ribosomal protein S17

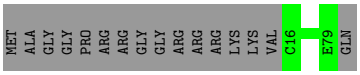
Chain q:





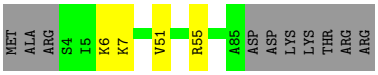
• Molecule 18: 30S ribosomal protein S18

Chain r:



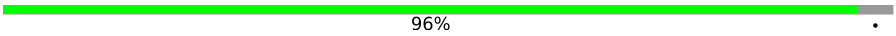
• Molecule 19: 30S ribosomal protein S19

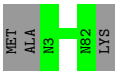
Chain s:



• Molecule 20: 30S ribosomal protein S20

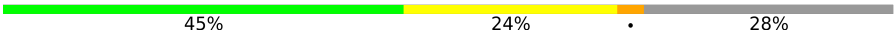
Chain t:

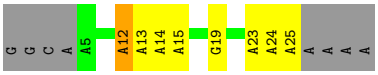




• Molecule 21: mRNA

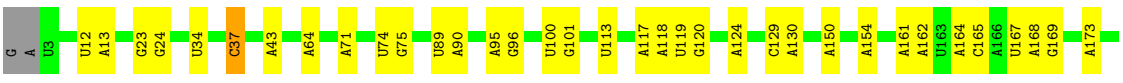
Chain v:

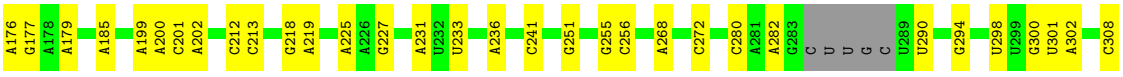


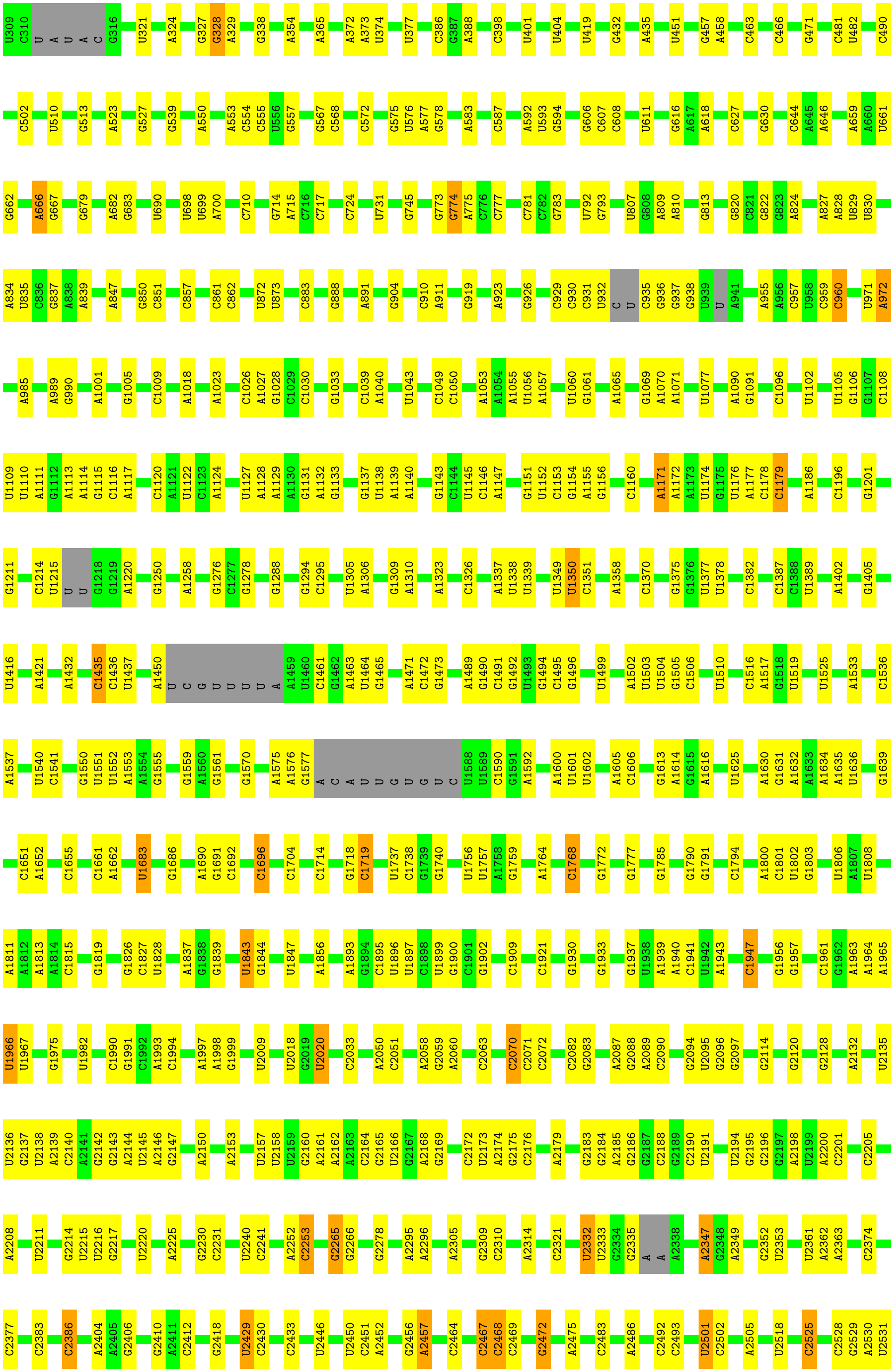


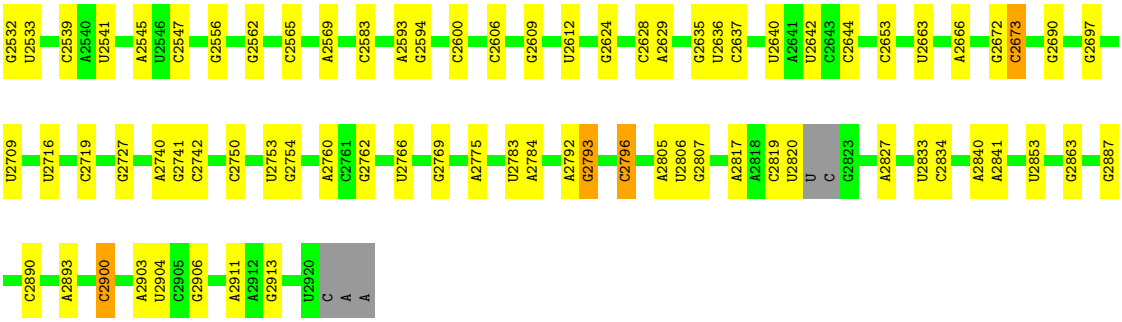
• Molecule 22: 23S rRNA

Chain A:



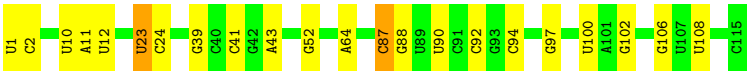



U309 C310 U A U A C G316 U321 A324 G327 G328 A329 G338 A354 A365 A372 A373 U374 U377 C386 G387 A388 C398 U401 U404 U419 G432 A435 U451 G457 A458 C463 C466 G471 C481 U482 C490
C502 U510 G513 A523 G527 G539 A550 A553 C554 C555 U556 G557 G567 C568 C572 G575 U576 A577 G578 A583 C587 A592 U593 G594 G606 C607 C608 U611 G616 A617 A618 C627 G630 C644 A645 A646 A659 A660 U661
G662 A666 G667 G679 A682 G683 U690 U698 U699 A700 C710 G714 A715 C716 C717 C724 U731 G745 G773 G774 A775 C776 C777 C781 C782 G783 U792 G793 U807 G808 A809 A810 G813 G820 C821 G822 G823 A824 A827 A828 U829 U830
A834 U835 C836 G837 A838 A839 A847 G850 C851 C857 C861 C862 U872 U873 C883 G888 A891 G904 C910 A911 G919 A923 G926 C929 C930 C931 U932 C U C935 G936 G937 G938 U939 U A941 A955 A956 C957 U958 C959 C960 U971 A972
A985 A989 G990 A1001 G1005 C1009 A1018 A1023 C1026 A1027 G1028 C1029 C1030 G1033 C1039 A1040 U1043 C1049 C1050 A1053 A1054 A1055 U1056 A1057 U1060 G1061 A1065 G1069 A1070 A1071 U1077 A1090 G1091 C1096 U1102 U1105 G1106 G1107 C1108
U1109 U1110 A1111 G1112 A1113 A1114 G1115 C1116 A1117 C1120 A1121 U1122 C1123 A1124 U1127 A1128 A1129 A1130 G1131 A1132 G1133 G1137 U1138 A1139 A1140 G1143 C1144 U1145 C1146 A1147 G1151 U1152 C1153 G1154 A1155 G1156 C1160 A1171 A1172 A1173 U1174 G1175 U1176 A1177 C1178 C1179 A1186 C1196 G1201
G1211 C1214 U1215 U U G1218 G1219 A1220 G1250 A1258 G1276 C1277 G1278 G1288 G1294 C1295 U1305 A1306 G1309 A1310 A1323 C1326 A1337 U1338 U1339 U1349 U1350 C1351 A1358 C1370 G1375 G1376 U1377 U1378 C1382 C1387 C1388 U1389 A1402 G1405
U1416 A1421 A1432 C1435 C1436 U1437 A1450 U C G U U U U A A1459 U1460 C1461 G1462 A1463 U1464 G1465 A1471 C1472 G1473 A1489 G1490 C1491 G1492 U1493 G1494 C1495 G1496 U1499 A1502 U1503 U1504 G1505 C1506 U1510 C1516 A1517 G1518 U1519 U1525 A1533 C1536
A1537 U1540 C1541 G1550 U1551 U1552 A1553 A1554 G1555 G1559 A1560 G1561 G1570 A1575 A1576 G1577 A C A U U G U G U C U1588 U1589 C1590 G1591 A1592 A1600 U1601 U1602 A1605 C1606 G1613 A1614 G1615 A1616 U1625 A1630 G1631 A1632 A1633 A1634 A1635 U1636 G1639
C1651 A1652 C1655 C1661 A1662 U1683 G1686 A1690 G1691 C1692 C1696 C1704 C1714 G1718 C1719 U1737 C1738 G1739 G1740 U1756 U1757 A1758 G1759 A1764 C1768 G1772 G1777 G1785 G1790 G1791 C1794 A1800 C1801 U1802 G1803 U1806 A1807 U1808
A1811 A1812 A1813 A1814 C1815 G1819 G1826 C1827 U1828 A1837 G1838 G1839 U1843 G1844 U1847 A1856 A1893 G1894 C1895 U1896 U1897 C1898 U1899 G1900 C1901 G1902 C1909 C1921 G1930 G1933 G1937 U1938 A1939 A1940 C1941 U1942 A1943 C1947 G1956 G1957 C1961 G1962 A1963 A1964 A1965
U1966 U1967 G1975 U1982 C1990 G1991 C1992 A1993 C1994 A1997 A1998 G1999 U2009 U2018 G2019 U2020 C2033 A2050 C2051 A2058 G2059 A2060 C2063 C2070 C2071 C2072 C2082 G2083 A2087 G2088 A2089 C2090 G2094 U2095 G2096 G2097 G2114 G2120 G2128 A2132 U2135
U2136 G2137 U2138 A2139 C2140 A2141 G2142 G2143 A2144 U2145 A2146 G2147 A2150 A2153 U2157 U2158 U2159 G2160 A2161 A2162 A2163 C2164 G2165 U2166 G2167 A2168 G2169 C2172 U2173 A2174 G2175 C2176 A2179 G2183 G2184 A2185 G2186 G2187 C2188 G2189 C2190 U2191 U2194 G2195 G2196 G2197 A2198 U2199 A2200 C2201 C2205
A2208 U2211 G2214 U2215 U2216 G2217 U2220 A2225 G2230 C2231 U2240 C2241 A2252 C2253 G2265 G2266 G2278 A2295 A2296 A2305 G2309 C2310 A2314 C2321 U2332 U2333 G2334 G2335 A A A2338 A2347 G2348 A2349 G2352 U2353 U2361 A2362 A2363 C2374
C2377 C2383 C2386 A2404 A2405 G2406 G2410 A2411 C2412 G2418 U2429 C2430 C2433 U2446 U2450 C2451 A2452 G2456 A2457 C2464 C2467 C2468 C2469 G2472 A2475 C2483 A2486 C2492 C2493 U2501 C2502 A2505 U2518 C2525 C2528 G2529 A2530 U2531



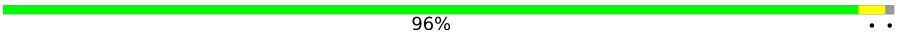
• Molecule 23: 5S rRNA

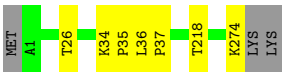
Chain B:



• Molecule 24: 50S ribosomal protein L2

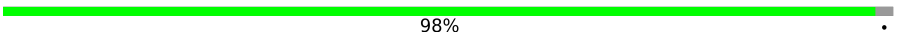
Chain D:

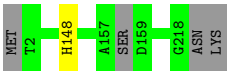




• Molecule 25: 50S ribosomal protein L3

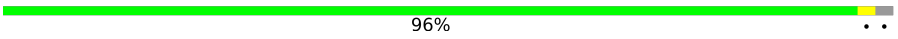
Chain E:





• Molecule 26: 50S ribosomal protein L4

Chain F:



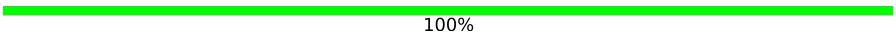
• Molecule 27: 50S ribosomal protein L5

Chain G:

• Molecule 28: 50S ribosomal protein L6

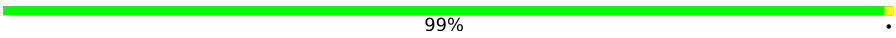
Chain H:

• Molecule 29: 50S ribosomal protein L13

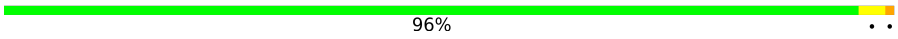
Chain M: 

There are no outlier residues recorded for this chain.

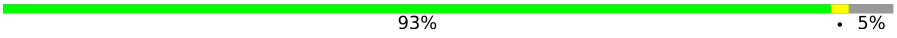
• Molecule 30: 50S ribosomal protein L14

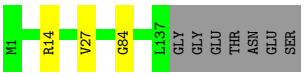
Chain N: 

• Molecule 31: 50S ribosomal protein L15

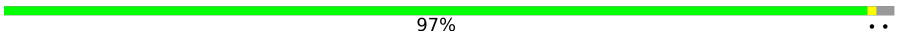
Chain O: 

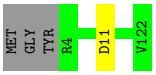
• Molecule 32: 50S ribosomal protein L16

Chain P: 

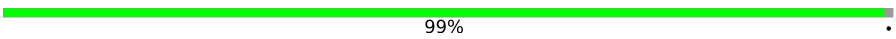


• Molecule 33: 50S ribosomal protein L17

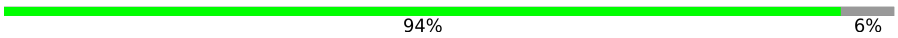
Chain Q: 

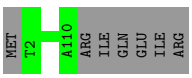


• Molecule 34: 50S ribosomal protein L18

Chain R: 

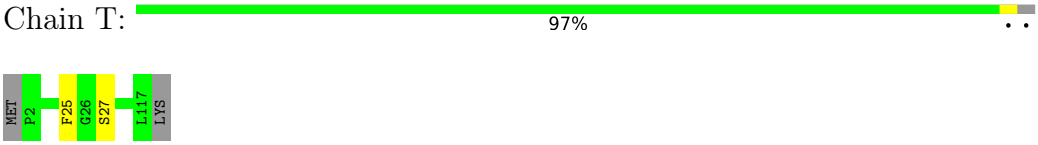
• Molecule 35: 50S ribosomal protein L19

Chain S: 



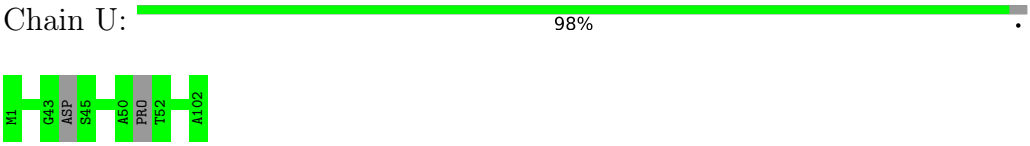
• Molecule 36: 50S ribosomal protein L20

Chain T:



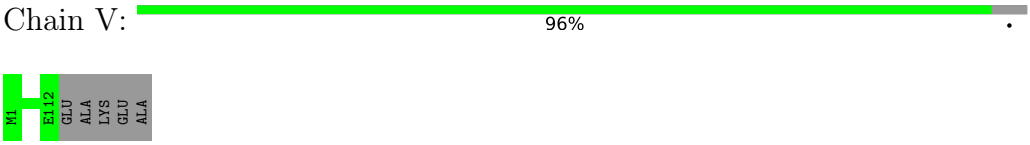
• Molecule 37: 50S ribosomal protein L21

Chain U:



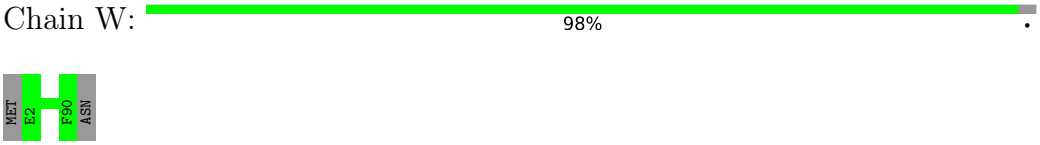
• Molecule 38: 50S ribosomal protein L22

Chain V:



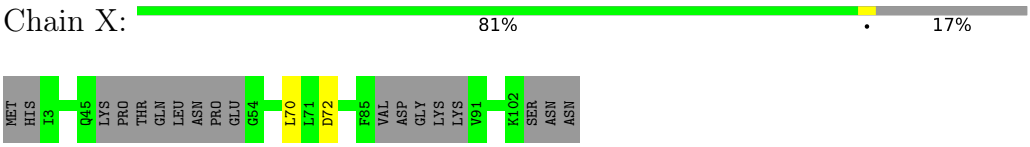
• Molecule 39: 50S ribosomal protein L23

Chain W:



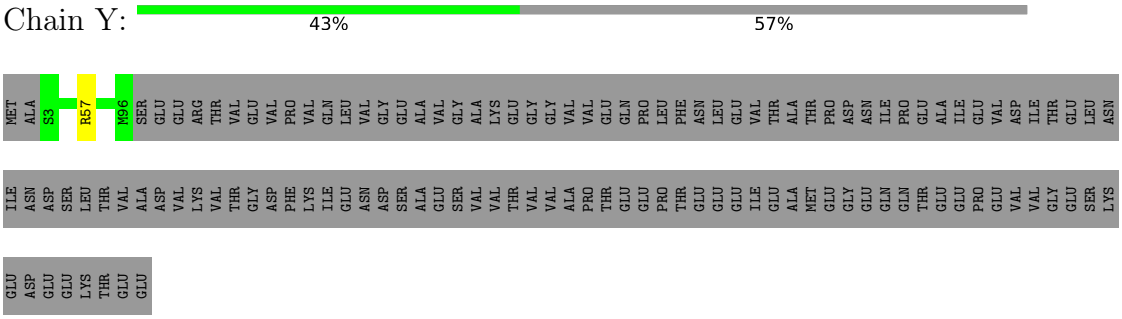
• Molecule 40: 50S ribosomal protein L24

Chain X:



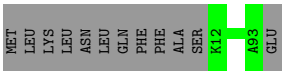
• Molecule 41: 50S ribosomal protein L25

Chain Y:



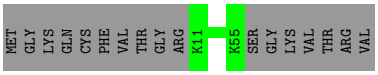
• Molecule 42: 50S ribosomal protein L27

Chain Z:



• Molecule 43: 50S ribosomal protein L28

Chain 0:

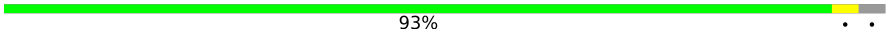


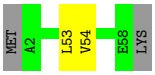
• Molecule 44: 50S ribosomal protein L29

Chain 1:

• Molecule 45: 50S ribosomal protein L30

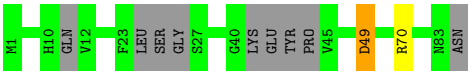
Chain 2:





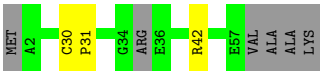
• Molecule 46: 50S ribosomal protein L31 type B

Chain 3:



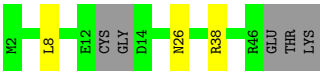
• Molecule 47: 50S ribosomal protein L32

Chain 4:



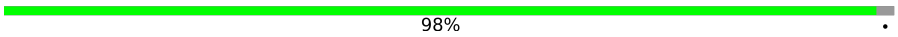
• Molecule 48: 50S ribosomal protein L33 2

Chain 5:



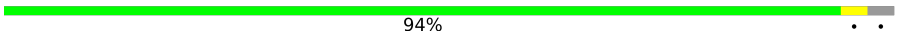
• Molecule 49: 50S ribosomal protein L34

Chain 6:



• Molecule 50: 50S ribosomal protein L35

Chain 7:



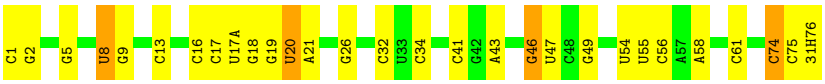
• Molecule 51: 50S ribosomal protein L36

Chain 8:

There are no outlier residues recorded for this chain.

• Molecule 52: P-site tRNA

Chain x:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	83000	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 ($e^-/Å^2$)	1.5	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: K, OMC, PSU, 4OC, 4SU, 2MA, OMG, 5MU, 31H, 7MG, MA6, H2U, MG, 2MG

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	a	0.47	1/36920 (0.0%)	0.98	103/57570 (0.2%)
2	b	0.29	0/1788	0.53	0/2397
3	c	0.27	0/1598	0.52	0/2145
4	d	0.30	0/1629	0.54	0/2185
5	e	0.30	0/1183	0.57	1/1595 (0.1%)
6	f	0.30	0/809	0.51	0/1085
7	g	0.29	0/1192	0.50	0/1603
8	h	0.29	0/1044	0.56	0/1401
9	i	0.30	0/1023	0.58	1/1372 (0.1%)
10	j	0.28	0/795	0.55	0/1071
11	k	0.28	0/848	0.50	0/1147
12	l	0.30	0/1075	0.58	0/1439
13	m	0.28	0/934	0.56	0/1253
14	n	0.26	0/490	0.49	0/650
15	o	0.25	0/747	0.45	0/996
16	p	0.30	0/723	0.56	0/971
17	q	0.28	0/706	0.56	0/944
18	r	0.28	0/536	0.51	0/718
19	s	0.27	0/679	0.50	0/912
20	t	0.23	0/606	0.47	0/810
21	v	0.43	0/521	1.02	1/812 (0.1%)
22	A	0.78	4/69062 (0.0%)	1.06	202/107697 (0.2%)
23	B	0.49	0/2733	1.06	21/4257 (0.5%)
24	D	0.45	2/2129 (0.1%)	0.64	2/2858 (0.1%)
25	E	0.40	0/1659	0.59	1/2224 (0.0%)
26	F	0.39	0/1563	0.56	0/2113
27	G	0.29	0/1201	0.53	0/1610
28	H	0.29	0/1267	0.53	0/1710
29	M	0.35	0/1173	0.52	0/1578
30	N	0.39	0/927	0.58	0/1243
31	O	0.42	1/1112 (0.1%)	0.63	1/1482 (0.1%)
32	P	0.39	0/1121	0.58	1/1504 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
33	Q	0.34	0/943	0.57	0/1259
34	R	0.29	0/920	0.53	0/1230
35	S	0.37	0/889	0.61	0/1189
36	T	0.40	0/955	0.52	0/1265
37	U	0.37	0/791	0.55	0/1051
38	V	0.36	0/870	0.58	0/1171
39	W	0.36	0/733	0.57	0/978
40	X	0.32	0/666	0.66	1/886 (0.1%)
41	Y	0.29	0/738	0.54	0/989
42	Z	0.43	0/632	0.55	0/838
43	0	0.39	0/363	0.66	0/486
44	1	0.29	0/537	0.49	0/714
45	2	0.34	0/443	0.61	1/597 (0.2%)
46	3	0.31	0/602	0.61	1/802 (0.1%)
47	4	0.52	1/416 (0.2%)	0.63	1/550 (0.2%)
48	5	0.31	0/373	0.69	1/495 (0.2%)
49	6	0.41	0/377	0.56	0/491
50	7	0.37	0/526	0.56	0/690
51	8	0.36	0/299	0.53	0/392
52	x	0.46	0/1671	1.08	10/2605 (0.4%)
All	All	0.61	9/153537 (0.0%)	0.94	349/230030 (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
3	c	0	1
5	e	0	1
26	F	0	1
30	N	0	1
36	T	0	1
44	1	0	2
48	5	0	1
All	All	0	8

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
22	A	774	G	N9-C4	-6.94	1.32	1.38
22	A	774	G	C2-N3	-6.62	1.27	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
22	A	774	G	N3-C4	-5.88	1.31	1.35
1	a	204	A	N9-C4	5.49	1.41	1.37
31	O	8	PRO	N-CD	5.43	1.55	1.47
24	D	35	PRO	N-CD	5.29	1.55	1.47
24	D	37	PRO	N-CD	5.23	1.55	1.47
22	A	2457	A	N9-C4	-5.18	1.34	1.37
47	4	31	PRO	N-CD	5.08	1.54	1.47

All (349) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	A	774	G	N3-C4-N9	-13.61	117.83	126.00
22	A	12	U	N1-C2-O2	12.05	131.24	122.80
22	A	12	U	N3-C2-O2	-11.78	113.95	122.20
22	A	12	U	C2-N1-C1'	11.58	131.59	117.70
23	B	87	C	N1-C2-O2	10.47	125.19	118.90
1	a	1441	C	N1-C2-O2	9.87	124.82	118.90
22	A	774	G	N3-C4-C5	9.75	133.48	128.60
22	A	1802	U	N3-C2-O2	-9.59	115.49	122.20
23	B	87	C	C2-N1-C1'	9.51	129.26	118.80
22	A	774	G	N3-C2-N2	-9.38	113.33	119.90
1	a	1441	C	C2-N1-C1'	9.28	129.00	118.80
23	B	87	C	N3-C2-O2	-9.13	115.51	121.90
22	A	774	G	C8-N9-C1'	9.03	138.73	127.00
1	a	1441	C	N3-C2-O2	-8.90	115.67	121.90
1	a	376	U	C2-N1-C1'	8.87	128.35	117.70
1	a	762	C	C2-N1-C1'	8.80	128.48	118.80
22	A	272	C	N1-C2-O2	8.68	124.11	118.90
22	A	1350	U	C2-N1-C1'	8.61	128.03	117.70
22	A	1802	U	N1-C2-O2	8.53	128.77	122.80
1	a	572	U	N3-C2-O2	-8.39	116.33	122.20
22	A	1802	U	C2-N1-C1'	8.31	127.67	117.70
22	A	1351	C	N1-C2-O2	8.30	123.88	118.90
22	A	1435	C	N1-C2-O2	8.22	123.83	118.90
22	A	774	G	N9-C4-C5	8.21	108.69	105.40
1	a	851	U	N1-C2-O2	8.20	128.54	122.80
1	a	762	C	N1-C2-O2	8.20	123.82	118.90
22	A	1602	U	N3-C2-O2	-8.18	116.47	122.20
22	A	1719	C	C6-N1-C2	-8.18	117.03	120.30
1	a	315	U	C2-N1-C1'	8.14	127.47	117.70
1	a	376	U	N1-C2-O2	8.14	128.50	122.80
22	A	1350	U	N1-C2-O2	8.11	128.48	122.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	a	572	U	C2-N1-C1'	8.08	127.40	117.70
1	a	641	U	C2-N1-C1'	7.90	127.18	117.70
1	a	572	U	N1-C2-O2	7.84	128.29	122.80
22	A	1602	U	N1-C2-O2	7.84	128.29	122.80
1	a	1391	U	N3-C2-O2	-7.76	116.77	122.20
22	A	557	G	O4'-C1'-N9	7.74	114.39	108.20
1	a	1391	U	N1-C2-O2	7.67	128.17	122.80
1	a	195	C	N1-C2-O2	7.66	123.49	118.90
22	A	1602	U	C2-N1-C1'	7.64	126.86	117.70
1	a	945	C	N1-C2-O2	7.61	123.46	118.90
1	a	851	U	C2-N1-C1'	7.60	126.82	117.70
1	a	1458	C	N1-C2-O2	7.60	123.46	118.90
22	A	1350	U	N3-C2-O2	-7.58	116.90	122.20
22	A	1801	C	C6-N1-C2	-7.55	117.28	120.30
22	A	774	G	C2-N3-C4	-7.50	108.15	111.90
22	A	12	U	C6-N1-C1'	-7.45	110.77	121.20
22	A	835	U	N1-C2-O2	7.42	128.00	122.80
22	A	2467	C	O4'-C1'-N1	7.42	114.14	108.20
23	B	100	U	C2-N1-C1'	7.41	126.59	117.70
1	a	315	U	N1-C2-O2	7.41	127.99	122.80
1	a	315	U	N3-C2-O2	-7.39	117.03	122.20
22	A	2807	G	C4-N9-C1'	7.35	136.06	126.50
22	A	1704	C	C6-N1-C2	-7.32	117.37	120.30
22	A	587	C	N1-C2-O2	7.30	123.28	118.90
1	a	851	U	N3-C2-O2	-7.30	117.09	122.20
1	a	641	U	N3-C2-O2	-7.26	117.12	122.20
22	A	272	C	C2-N1-C1'	7.20	126.72	118.80
22	A	1351	C	C6-N1-C2	-7.14	117.44	120.30
22	A	2332	U	C2-N1-C1'	7.09	126.21	117.70
1	a	641	U	N1-C2-O2	7.08	127.75	122.80
22	A	2492	C	N1-C2-O2	7.00	123.10	118.90
1	a	195	C	N3-C2-O2	-6.98	117.01	121.90
1	a	376	U	N3-C2-O2	-6.98	117.31	122.20
22	A	972	A	O5'-P-OP2	-6.97	99.43	105.70
22	A	1435	C	N3-C2-O2	-6.95	117.03	121.90
5	e	80	THR	C-N-CA	6.93	139.02	121.70
22	A	272	C	N3-C2-O2	-6.90	117.07	121.90
22	A	835	U	C2-N1-C1'	6.90	125.98	117.70
22	A	774	G	C8-N9-C4	-6.89	103.64	106.40
1	a	1168	C	C2-N1-C1'	6.88	126.36	118.80
22	A	774	G	C4-N9-C1'	-6.83	117.62	126.50
22	A	835	U	N3-C2-O2	-6.72	117.49	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	a	759	U	C2-N1-C1'	6.69	125.73	117.70
1	a	992	A	C2-N3-C4	6.64	113.92	110.60
22	A	1661	C	C6-N1-C2	-6.64	117.64	120.30
23	B	87	C	C6-N1-C1'	-6.64	112.83	120.80
22	A	2468	C	N1-C2-O2	6.63	122.88	118.90
1	a	762	C	N3-C2-O2	-6.62	117.27	121.90
22	A	2072	C	C6-N1-C2	-6.62	117.65	120.30
1	a	1171	C	N1-C2-O2	6.62	122.87	118.90
1	a	55	C	N1-C2-O2	6.60	122.86	118.90
22	A	1351	C	C5-C6-N1	6.58	124.29	121.00
22	A	587	C	N3-C2-O2	-6.57	117.30	121.90
22	A	1768	C	C6-N1-C2	-6.57	117.67	120.30
22	A	1351	C	C2-N1-C1'	6.55	126.01	118.80
1	a	463	U	C2-N1-C1'	6.54	125.54	117.70
1	a	1168	C	N1-C2-O2	6.53	122.82	118.90
1	a	1441	C	C6-N1-C1'	-6.53	112.97	120.80
22	A	2468	C	C6-N1-C2	-6.52	117.69	120.30
22	A	935	C	C2-N1-C1'	6.50	125.94	118.80
22	A	272	C	C6-N1-C2	-6.49	117.70	120.30
22	A	2468	C	N3-C2-O2	-6.46	117.38	121.90
1	a	195	C	C2-N1-C1'	6.46	125.91	118.80
22	A	1351	C	N3-C2-O2	-6.45	117.38	121.90
22	A	793	G	O4'-C1'-N9	6.43	113.35	108.20
1	a	1458	C	C2-N1-C1'	6.38	125.82	118.80
1	a	762	C	C6-N1-C2	-6.37	117.75	120.30
22	A	2457	A	C2-N3-C4	-6.36	107.42	110.60
1	a	491	C	C2-N1-C1'	6.35	125.79	118.80
22	A	883	C	N1-C2-O2	6.34	122.70	118.90
22	A	2807	G	C8-N9-C1'	-6.33	118.77	127.00
22	A	935	C	N1-C2-O2	6.30	122.68	118.90
1	a	1391	U	C2-N1-C1'	6.30	125.26	117.70
1	a	1458	C	N3-C2-O2	-6.28	117.50	121.90
22	A	666	A	O4'-C1'-N9	6.28	113.22	108.20
22	A	1696	C	N1-C2-O2	6.27	122.66	118.90
22	A	328	G	P-O3'-C3'	6.23	127.18	119.70
22	A	714	G	N3-C4-C5	-6.23	125.48	128.60
22	A	1683	U	N1-C2-O2	6.21	127.15	122.80
48	5	8	LEU	CA-CB-CG	6.21	129.59	115.30
22	A	2429	U	C2-N1-C1'	6.20	125.14	117.70
32	P	84	GLY	N-CA-C	6.19	128.58	113.10
1	a	888	C	C6-N1-C2	-6.19	117.82	120.30
22	A	1049	C	N1-C2-O2	6.17	122.60	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	A	862	C	C6-N1-C2	-6.17	117.83	120.30
1	a	1178	C	N1-C2-O2	6.16	122.60	118.90
22	A	714	G	N3-C4-N9	6.13	129.68	126.00
22	A	1683	U	N3-C2-O2	-6.11	117.93	122.20
22	A	828	A	C2-N3-C4	6.09	113.64	110.60
1	a	818	C	N1-C2-O2	6.08	122.55	118.90
1	a	1171	C	C2-N1-C1'	6.08	125.48	118.80
22	A	2492	C	N3-C2-O2	-6.07	117.65	121.90
1	a	204	A	C2-N3-C4	6.06	113.63	110.60
1	a	376	U	C6-N1-C1'	-6.03	112.76	121.20
22	A	2583	C	N1-C2-O2	6.01	122.50	118.90
1	a	621	C	N1-C2-O2	6.00	122.50	118.90
22	A	644	C	C6-N1-C2	-5.99	117.90	120.30
22	A	2095	U	C2-N3-C4	5.97	130.58	127.00
23	B	87	C	C6-N1-C2	-5.97	117.91	120.30
22	A	1179	C	C5-C6-N1	5.96	123.98	121.00
22	A	1696	C	N3-C2-O2	-5.94	117.74	121.90
22	A	714	G	C2-N3-C4	5.93	114.86	111.90
1	a	1441	C	C6-N1-C2	-5.93	117.93	120.30
22	A	2900	C	N1-C2-O2	5.91	122.45	118.90
22	A	1043	U	N3-C2-O2	-5.91	118.06	122.20
22	A	1714	C	C6-N1-C2	-5.90	117.94	120.30
22	A	2492	C	C6-N1-C2	-5.88	117.95	120.30
1	a	762	C	C6-N1-C1'	-5.88	113.75	120.80
22	A	2332	U	N1-C2-O2	5.88	126.91	122.80
1	a	132	C	C6-N1-C2	-5.85	117.96	120.30
22	A	1921	C	N1-C2-O2	5.85	122.41	118.90
52	x	74	C	N1-C2-O2	5.85	122.41	118.90
22	A	2071	C	C6-N1-C2	-5.84	117.97	120.30
1	a	477	U	C2-N1-C1'	5.84	124.70	117.70
22	A	2501	U	N1-C2-O2	5.83	126.88	122.80
22	A	2793	G	C4-N9-C1'	5.83	134.08	126.50
52	x	34	C	C6-N1-C2	-5.83	117.97	120.30
21	v	12	A	C2-N3-C4	5.82	113.51	110.60
22	A	2539	C	C6-N1-C2	-5.82	117.97	120.30
22	A	2742	C	C6-N1-C2	-5.82	117.97	120.30
1	a	463	U	N3-C2-O2	-5.82	118.13	122.20
22	A	1704	C	N1-C2-O2	5.80	122.38	118.90
1	a	491	C	N3-C2-O2	-5.79	117.85	121.90
22	A	12	U	C6-N1-C2	-5.78	117.53	121.00
22	A	1043	U	N1-C2-O2	5.78	126.84	122.80
22	A	568	C	C6-N1-C2	-5.77	117.99	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	A	2819	C	N1-C2-O2	5.77	122.36	118.90
22	A	828	A	C8-N9-C4	-5.77	103.49	105.80
22	A	2492	C	C2-N1-C1'	5.75	125.12	118.80
22	A	861	C	C6-N1-C2	-5.75	118.00	120.30
23	B	94	C	N1-C2-O2	5.74	122.35	118.90
22	A	1065	A	C2-N3-C4	5.72	113.46	110.60
1	a	491	C	N1-C2-O2	5.71	122.33	118.90
1	a	945	C	N3-C2-O2	-5.70	117.91	121.90
1	a	992	A	N3-C4-N9	5.70	131.96	127.40
52	x	1	C	N1-C2-O2	5.69	122.31	118.90
1	a	1458	C	C6-N1-C2	-5.69	118.03	120.30
22	A	1196	C	C6-N1-C2	-5.69	118.03	120.30
22	A	1382	C	N1-C2-O2	5.69	122.31	118.90
47	4	30	CYS	C-N-CD	5.68	140.33	128.40
22	A	1009	C	N1-C2-O2	5.68	122.31	118.90
22	A	1843	U	N1-C2-O2	5.67	126.77	122.80
22	A	2900	C	C6-N1-C2	-5.67	118.03	120.30
23	B	23	U	C5-C6-N1	5.67	125.53	122.70
1	a	1171	C	C6-N1-C2	-5.67	118.03	120.30
1	a	463	U	N1-C2-O2	5.66	126.76	122.80
1	a	886	C	C6-N1-C2	-5.65	118.04	120.30
22	A	2673	C	C6-N1-C2	-5.65	118.04	120.30
52	x	1	C	P-O3'-C3'	5.64	126.47	119.70
22	A	2070	C	C6-N1-C2	-5.63	118.05	120.30
22	A	2719	C	C6-N1-C2	-5.63	118.05	120.30
22	A	1171	A	C4-N9-C1'	5.63	136.44	126.30
22	A	1661	C	C2-N1-C1'	5.63	124.99	118.80
22	A	957	C	N1-C2-O2	5.63	122.28	118.90
1	a	1289	A	C4-N9-C1'	5.62	136.41	126.30
22	A	463	C	C6-N1-C2	-5.61	118.06	120.30
1	a	627	U	C2-N1-C1'	5.61	124.43	117.70
22	A	12	U	C5-C6-N1	5.60	125.50	122.70
1	a	759	U	N1-C2-O2	5.60	126.72	122.80
22	A	2766	U	N3-C2-O2	-5.60	118.28	122.20
22	A	1179	C	C6-N1-C2	-5.59	118.06	120.30
1	a	1459	C	N1-C2-O2	5.58	122.25	118.90
52	x	34	C	C5-C6-N1	5.58	123.79	121.00
22	A	1961	C	N1-C2-O2	5.57	122.24	118.90
22	A	1160	C	N1-C2-O2	5.57	122.24	118.90
24	D	34	LYS	C-N-CD	5.56	140.07	128.40
22	A	2020	U	N3-C2-O2	-5.56	118.31	122.20
1	a	320	C	C6-N1-C2	-5.53	118.09	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
24	D	36	LEU	C-N-CD	5.53	140.02	128.40
22	A	883	C	N3-C2-O2	-5.53	118.03	121.90
22	A	627	C	N3-C2-O2	-5.52	118.03	121.90
1	a	20	C	N1-C2-O2	5.52	122.21	118.90
23	B	23	U	N3-C2-O2	-5.51	118.34	122.20
1	a	759	U	N3-C2-O2	-5.51	118.34	122.20
52	x	74	C	N3-C2-O2	-5.51	118.05	121.90
22	A	2430	C	N1-C2-O2	5.50	122.20	118.90
23	B	92	C	C6-N1-C2	-5.50	118.10	120.30
23	B	1	U	C2-N1-C1'	5.50	124.30	117.70
22	A	1171	A	N7-C8-N9	5.48	116.54	113.80
22	A	666	A	N7-C8-N9	5.48	116.54	113.80
22	A	2457	A	N1-C2-N3	5.47	132.04	129.30
1	a	1289	A	C2-N3-C4	5.47	113.34	110.60
31	O	7	LYS	C-N-CD	5.47	139.89	128.40
23	B	94	C	N3-C2-O2	-5.46	118.08	121.90
1	a	945	C	C2-N1-C1'	5.45	124.80	118.80
22	A	1704	C	N3-C2-O2	-5.45	118.08	121.90
1	a	20	C	C6-N1-C2	-5.45	118.12	120.30
22	A	1350	U	C6-N1-C1'	-5.45	113.58	121.20
22	A	1806	U	C5-C6-N1	-5.45	119.98	122.70
1	a	546	U	C5-C6-N1	5.44	125.42	122.70
22	A	1655	C	C6-N1-C2	-5.43	118.13	120.30
1	a	20	C	N3-C2-O2	-5.43	118.10	121.90
22	A	2333	U	C2-N1-C1'	5.42	124.20	117.70
22	A	1704	C	C5-C6-N1	5.42	123.71	121.00
22	A	1768	C	C5-C6-N1	5.42	123.71	121.00
22	A	2653	C	C6-N1-C2	-5.42	118.13	120.30
22	A	627	C	N1-C2-O2	5.40	122.14	118.90
22	A	587	C	C2-N1-C1'	5.39	124.73	118.80
22	A	2265	G	N3-C4-C5	-5.39	125.91	128.60
1	a	220	U	OP1-P-O3'	5.38	117.04	105.20
22	A	1661	C	N3-C2-O2	-5.38	118.13	121.90
1	a	55	C	N3-C2-O2	-5.38	118.14	121.90
1	a	821	U	N1-C2-O2	5.38	126.56	122.80
22	A	1370	C	N1-C2-O2	5.38	122.13	118.90
1	a	1407	C	N1-C2-O2	5.37	122.12	118.90
22	A	2020	U	N1-C2-O2	5.37	126.56	122.80
22	A	2386	C	N1-C2-O2	5.37	122.12	118.90
1	a	621	C	C6-N1-C2	-5.36	118.16	120.30
22	A	2606	C	N1-C2-O2	5.36	122.12	118.90
22	A	1179	C	C2-N1-C1'	5.36	124.69	118.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	A	2429	U	N1-C2-O2	5.36	126.55	122.80
22	A	2890	C	C6-N1-C2	-5.36	118.16	120.30
22	A	2644	C	C6-N1-C2	-5.35	118.16	120.30
22	A	1050	C	C6-N1-C2	-5.35	118.16	120.30
1	a	461	C	C6-N1-C2	-5.34	118.16	120.30
22	A	2295	A	O4'-C1'-N9	5.33	112.47	108.20
1	a	227	C	C6-N1-C2	-5.33	118.17	120.30
22	A	935	C	N3-C2-O2	-5.33	118.17	121.90
1	a	137	U	N1-C2-O2	5.33	126.53	122.80
22	A	2070	C	C5-C6-N1	5.32	123.66	121.00
22	A	1802	U	C6-N1-C1'	-5.32	113.75	121.20
1	a	762	C	C5-C6-N1	5.32	123.66	121.00
23	B	23	U	N1-C2-O2	5.31	126.52	122.80
22	A	2090	C	C6-N1-C2	-5.30	118.18	120.30
23	B	100	U	N3-C2-O2	-5.30	118.49	122.20
23	B	1	U	N1-C2-O2	5.30	126.51	122.80
22	A	2464	C	C6-N1-C2	-5.29	118.18	120.30
45	2	53	LEU	CA-CB-CG	5.29	127.47	115.30
1	a	204	A	C4-N9-C1'	5.28	135.81	126.30
1	a	992	A	N3-C4-C5	-5.28	123.10	126.80
1	a	59	C	C6-N1-C2	-5.27	118.19	120.30
22	A	1171	A	N3-C4-N9	5.27	131.62	127.40
1	a	1168	C	N3-C2-O2	-5.26	118.22	121.90
22	A	1631	G	C4-N9-C1'	5.25	133.33	126.50
1	a	478	G	C8-N9-C4	-5.25	104.30	106.40
22	A	2469	C	N1-C2-O2	5.22	122.03	118.90
22	A	2834	C	C6-N1-C2	-5.22	118.21	120.30
9	i	23	LEU	CA-CB-CG	5.22	127.31	115.30
1	a	572	U	C6-N1-C1'	-5.22	113.89	121.20
22	A	37	C	N3-C2-O2	-5.22	118.25	121.90
1	a	1171	C	N3-C2-O2	-5.22	118.25	121.90
1	a	1033	U	C2-N1-C1'	5.21	123.96	117.70
22	A	777	C	C6-N1-C2	-5.21	118.21	120.30
22	A	608	C	C6-N1-C2	-5.20	118.22	120.30
22	A	666	A	C5-N7-C8	-5.19	101.31	103.90
22	A	1028	G	O4'-C1'-N9	5.19	112.35	108.20
1	a	1032	C	C2-N1-C1'	5.19	124.50	118.80
23	B	12	U	C2-N1-C1'	5.19	123.92	117.70
22	A	1214	C	N1-C2-O2	5.18	122.01	118.90
52	x	13	C	C6-N1-C2	-5.18	118.23	120.30
1	a	945	C	C6-N1-C2	-5.18	118.23	120.30
22	A	212	C	C6-N1-C2	-5.18	118.23	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	A	201	C	C6-N1-C2	-5.18	118.23	120.30
22	A	960	C	N1-C2-O2	5.18	122.01	118.90
22	A	2051	C	C6-N1-C2	-5.18	118.23	120.30
23	B	23	U	C6-N1-C2	-5.18	117.89	121.00
22	A	724	C	C6-N1-C2	-5.17	118.23	120.30
23	B	94	C	C6-N1-C2	-5.17	118.23	120.30
23	B	100	U	N1-C2-O2	5.17	126.42	122.80
22	A	1030	C	N1-C2-O2	5.17	122.00	118.90
22	A	1719	C	N3-C2-O2	-5.17	118.28	121.90
40	X	70	LEU	CA-CB-CG	5.17	127.19	115.30
22	A	1382	C	C6-N1-C2	-5.17	118.23	120.30
22	A	2253	C	N1-C2-O2	5.17	122.00	118.90
23	B	100	U	C6-N1-C1'	-5.16	113.98	121.20
1	a	1178	C	C2-N1-C1'	5.16	124.47	118.80
1	a	315	U	C6-N1-C1'	-5.15	113.98	121.20
22	A	644	C	N1-C2-O2	5.15	121.99	118.90
22	A	710	C	C6-N1-C2	-5.15	118.24	120.30
22	A	2796	C	N1-C2-O2	5.15	121.99	118.90
22	A	2483	C	C6-N1-C2	-5.15	118.24	120.30
22	A	1305	U	N3-C2-O2	-5.15	118.60	122.20
46	3	49	ASP	CB-CG-OD2	5.15	122.93	118.30
22	A	2070	C	N1-C2-O2	5.14	121.98	118.90
52	x	34	C	N1-C2-O2	5.13	121.98	118.90
1	a	1504	A	C2-N3-C4	5.13	113.17	110.60
22	A	272	C	C5-C6-N1	5.13	123.56	121.00
22	A	490	C	C6-N1-C2	-5.13	118.25	120.30
22	A	2451	C	N1-C2-O2	5.13	121.98	118.90
22	A	2750	C	C6-N1-C2	-5.13	118.25	120.30
22	A	419	U	N1-C2-O2	5.13	126.39	122.80
1	a	860	U	N3-C2-O2	-5.12	118.61	122.20
22	A	2347	A	C2-N3-C4	5.12	113.16	110.60
22	A	937	G	OP1-P-O3'	5.12	116.46	105.20
22	A	2612	U	C2-N1-C1'	5.11	123.84	117.70
22	A	2429	U	N3-C2-O2	-5.11	118.62	122.20
22	A	2583	C	C2-N1-C1'	5.11	124.42	118.80
1	a	10	G	O4'-C1'-N9	5.11	112.28	108.20
22	A	1801	C	C5-C6-N1	5.10	123.55	121.00
1	a	1289	A	N7-C8-N9	5.10	116.35	113.80
1	a	621	C	C5-C6-N1	5.10	123.55	121.00
22	A	555	C	N1-C2-O2	5.09	121.95	118.90
22	A	241	C	N1-C2-O2	5.09	121.95	118.90
52	x	34	C	C2-N1-C1'	5.09	124.40	118.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	A	1461	C	C6-N1-C2	-5.08	118.27	120.30
22	A	2493	C	N1-C2-O2	5.08	121.94	118.90
22	A	2583	C	C6-N1-C2	-5.08	118.27	120.30
22	A	2807	G	N3-C4-N9	5.07	129.04	126.00
22	A	2900	C	N3-C2-O2	-5.07	118.35	121.90
1	a	137	U	N3-C2-O2	-5.07	118.65	122.20
22	A	2383	C	C6-N1-C2	-5.06	118.28	120.30
22	A	213	C	N1-C2-O2	5.05	121.93	118.90
23	B	100	U	O4'-C1'-N1	5.05	112.24	108.20
1	a	631	C	C6-N1-C2	-5.05	118.28	120.30
22	A	957	C	C6-N1-C2	-5.05	118.28	120.30
22	A	256	C	C6-N1-C2	-5.04	118.28	120.30
22	A	113	U	N1-C2-O2	5.04	126.33	122.80
1	a	377	C	C6-N1-C2	-5.04	118.28	120.30
22	A	717	C	C6-N1-C2	-5.04	118.29	120.30
22	A	883	C	C6-N1-C2	-5.04	118.28	120.30
1	a	1171	C	C5-C6-N1	5.03	123.51	121.00
22	A	1435	C	C6-N1-C2	-5.03	118.29	120.30
22	A	1382	C	N3-C2-O2	-5.02	118.38	121.90
22	A	1794	C	C6-N1-C2	-5.02	118.29	120.30
22	A	607	C	C6-N1-C2	-5.01	118.29	120.30
22	A	1030	C	C5-C6-N1	5.01	123.50	121.00
52	x	41	C	N1-C2-O2	5.01	121.91	118.90
25	E	148	HIS	C-N-CA	5.00	134.21	121.70

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
44	1	58	ARG	Sidechain
44	1	7	ARG	Sidechain
48	5	26	ASN	Peptide
26	F	188	ASN	Peptide
30	N	17	ARG	Sidechain
36	T	25	PHE	Peptide
3	c	155	ARG	Sidechain
5	e	32	ARG	Sidechain

5.2 Too-close contacts (i)

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

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	b	215/255 (84%)	202 (94%)	13 (6%)	0	100	100
3	c	194/217 (89%)	186 (96%)	8 (4%)	0	100	100
4	d	193/200 (96%)	187 (97%)	6 (3%)	0	100	100
5	e	155/166 (93%)	151 (97%)	4 (3%)	0	100	100
6	f	94/98 (96%)	92 (98%)	2 (2%)	0	100	100
7	g	142/156 (91%)	137 (96%)	5 (4%)	0	100	100
8	h	129/132 (98%)	125 (97%)	4 (3%)	0	100	100
9	i	123/132 (93%)	117 (95%)	6 (5%)	0	100	100
10	j	96/102 (94%)	90 (94%)	6 (6%)	0	100	100
11	k	111/129 (86%)	105 (95%)	6 (5%)	0	100	100
12	l	133/137 (97%)	126 (95%)	7 (5%)	0	100	100
13	m	115/121 (95%)	113 (98%)	2 (2%)	0	100	100
14	n	58/89 (65%)	58 (100%)	0	0	100	100
15	o	86/89 (97%)	84 (98%)	2 (2%)	0	100	100
16	p	88/91 (97%)	83 (94%)	5 (6%)	0	100	100
17	q	83/87 (95%)	75 (90%)	8 (10%)	0	100	100
18	r	62/80 (78%)	60 (97%)	2 (3%)	0	100	100
19	s	80/92 (87%)	78 (98%)	2 (2%)	0	100	100
20	t	78/83 (94%)	77 (99%)	1 (1%)	0	100	100
24	D	272/277 (98%)	265 (97%)	7 (3%)	0	100	100
25	E	214/220 (97%)	205 (96%)	9 (4%)	0	100	100
26	F	201/207 (97%)	192 (96%)	9 (4%)	0	100	100
27	G	148/179 (83%)	139 (94%)	9 (6%)	0	100	100
28	H	156/178 (88%)	145 (93%)	11 (7%)	0	100	100
29	M	143/145 (99%)	138 (96%)	5 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
30	N	120/122 (98%)	115 (96%)	5 (4%)	0	100	100
31	O	144/146 (99%)	139 (96%)	5 (4%)	0	100	100
32	P	135/144 (94%)	134 (99%)	1 (1%)	0	100	100
33	Q	117/122 (96%)	114 (97%)	3 (3%)	0	100	100
34	R	116/119 (98%)	114 (98%)	2 (2%)	0	100	100
35	S	107/116 (92%)	101 (94%)	6 (6%)	0	100	100
36	T	114/118 (97%)	110 (96%)	4 (4%)	0	100	100
37	U	94/102 (92%)	90 (96%)	4 (4%)	0	100	100
38	V	110/117 (94%)	106 (96%)	4 (4%)	0	100	100
39	W	87/91 (96%)	84 (97%)	3 (3%)	0	100	100
40	X	81/105 (77%)	75 (93%)	6 (7%)	0	100	100
41	Y	92/217 (42%)	90 (98%)	2 (2%)	0	100	100
42	Z	80/94 (85%)	76 (95%)	4 (5%)	0	100	100
43	0	43/62 (69%)	38 (88%)	5 (12%)	0	100	100
44	1	63/69 (91%)	62 (98%)	1 (2%)	0	100	100
45	2	55/59 (93%)	51 (93%)	4 (7%)	0	100	100
46	3	67/84 (80%)	62 (92%)	5 (8%)	0	100	100
47	4	47/58 (81%)	45 (96%)	2 (4%)	0	100	100
48	5	40/49 (82%)	36 (90%)	4 (10%)	0	100	100
49	6	42/45 (93%)	40 (95%)	2 (5%)	0	100	100
50	7	62/66 (94%)	56 (90%)	6 (10%)	0	100	100
51	8	35/37 (95%)	35 (100%)	0	0	100	100
All	All	5220/5804 (90%)	5003 (96%)	217 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
2	b	189/221 (86%)	187 (99%)	2 (1%)	70 86
3	c	162/175 (93%)	162 (100%)	0	100 100
4	d	172/175 (98%)	172 (100%)	0	100 100
5	e	123/131 (94%)	122 (99%)	1 (1%)	79 90
6	f	84/86 (98%)	82 (98%)	2 (2%)	44 71
7	g	125/132 (95%)	125 (100%)	0	100 100
8	h	112/113 (99%)	112 (100%)	0	100 100
9	i	105/109 (96%)	105 (100%)	0	100 100
10	j	88/91 (97%)	88 (100%)	0	100 100
11	k	89/104 (86%)	88 (99%)	1 (1%)	70 86
12	l	117/119 (98%)	116 (99%)	1 (1%)	75 89
13	m	100/104 (96%)	99 (99%)	1 (1%)	73 87
14	n	50/78 (64%)	50 (100%)	0	100 100
15	o	80/81 (99%)	80 (100%)	0	100 100
16	p	76/77 (99%)	76 (100%)	0	100 100
17	q	80/82 (98%)	79 (99%)	1 (1%)	65 83
18	r	57/68 (84%)	57 (100%)	0	100 100
19	s	71/80 (89%)	67 (94%)	4 (6%)	17 50
20	t	67/69 (97%)	67 (100%)	0	100 100
24	D	221/224 (99%)	218 (99%)	3 (1%)	62 82
25	E	173/177 (98%)	173 (100%)	0	100 100
26	F	163/169 (96%)	158 (97%)	5 (3%)	35 66
27	G	131/158 (83%)	130 (99%)	1 (1%)	79 90
28	H	141/155 (91%)	137 (97%)	4 (3%)	38 68
29	M	123/123 (100%)	123 (100%)	0	100 100
30	N	100/100 (100%)	100 (100%)	0	100 100
31	O	112/112 (100%)	107 (96%)	5 (4%)	23 56
32	P	114/119 (96%)	112 (98%)	2 (2%)	54 77
33	Q	100/102 (98%)	99 (99%)	1 (1%)	73 87
34	R	93/95 (98%)	93 (100%)	0	100 100
35	S	95/102 (93%)	95 (100%)	0	100 100
36	T	96/98 (98%)	95 (99%)	1 (1%)	73 87

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
37	U	84/86 (98%)	84 (100%)	0	100 100
38	V	91/94 (97%)	91 (100%)	0	100 100
39	W	80/82 (98%)	80 (100%)	0	100 100
40	X	72/90 (80%)	71 (99%)	1 (1%)	62 82
41	Y	82/190 (43%)	81 (99%)	1 (1%)	67 85
42	Z	64/75 (85%)	64 (100%)	0	100 100
43	0	37/52 (71%)	37 (100%)	0	100 100
44	1	59/62 (95%)	59 (100%)	0	100 100
45	2	51/53 (96%)	50 (98%)	1 (2%)	50 75
46	3	63/75 (84%)	61 (97%)	2 (3%)	34 65
47	4	46/51 (90%)	45 (98%)	1 (2%)	47 73
48	5	43/47 (92%)	42 (98%)	1 (2%)	45 72
49	6	39/40 (98%)	39 (100%)	0	100 100
50	7	55/57 (96%)	53 (96%)	2 (4%)	30 62
51	8	34/35 (97%)	34 (100%)	0	100 100
All	All	4509/4918 (92%)	4465 (99%)	44 (1%)	71 87

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

Mol	Chain	Res	Type
2	b	138	LYS
2	b	167	ARG
5	e	88	ARG
6	f	52	ILE
6	f	56	LYS
11	k	113	VAL
12	l	99	ARG
13	m	102	THR
17	q	50	ASP
19	s	6	LYS
19	s	7	LYS
19	s	51	VAL
19	s	55	ARG
24	D	26	THR
24	D	218	THR
24	D	274	LYS
26	F	117	LYS

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Mol	Chain	Res	Type
26	F	121	ASN
26	F	184	LEU
26	F	188	ASN
26	F	190	ASP
27	G	51	ASP
28	H	43	PHE
28	H	56	SER
28	H	61	ASP
28	H	69	ARG
31	O	7	LYS
31	O	19	VAL
31	O	129	SER
31	O	134	GLU
31	O	139	LYS
32	P	14	ARG
32	P	27	VAL
33	Q	11	ASP
36	T	27	SER
40	X	72	ASP
41	Y	57	ARG
45	2	54	VAL
46	3	49	ASP
46	3	70	ARG
47	4	42	ARG
48	5	38	ARG
50	7	31	HIS
50	7	32	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (68) such sidechains are listed below:

Mol	Chain	Res	Type
2	b	15	HIS
2	b	55	ASN
2	b	159	GLN
3	c	6	ASN
3	c	64	ASN
3	c	68	HIS
3	c	91	ASN
3	c	133	GLN
4	d	8	ASN
4	d	67	GLN
4	d	137	GLN

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Mol	Chain	Res	Type
4	d	192	GLN
5	e	145	GLN
5	e	166	ASN
7	g	28	ASN
7	g	122	ASN
9	i	33	ASN
12	l	25	ASN
12	l	73	ASN
13	m	74	ASN
15	o	37	ASN
15	o	42	HIS
15	o	65	HIS
15	o	68	ASN
17	q	49	HIS
17	q	52	ASN
17	q	64	GLN
18	r	57	GLN
20	t	67	HIS
24	D	225	ASN
24	D	229	HIS
24	D	231	HIS
25	E	33	ASN
25	E	143	HIS
26	F	3	ASN
26	F	141	ASN
26	F	158	ASN
28	H	48	ASN
28	H	65	HIS
29	M	3	GLN
29	M	11	ASN
29	M	81	HIS
31	O	38	GLN
31	O	78	ASN
31	O	126	HIS
32	P	25	ASN
32	P	35	GLN
33	Q	106	GLN
34	R	8	ASN
35	S	4	HIS
35	S	79	HIS
37	U	18	GLN
39	W	37	GLN

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Mol	Chain	Res	Type
40	X	69	GLN
41	Y	20	GLN
42	Z	58	ASN
43	0	34	GLN
46	3	55	HIS
46	3	75	ASN
46	3	83	ASN
48	5	22	ASN
48	5	25	ASN
48	5	26	ASN
49	6	7	GLN
49	6	17	HIS
50	7	31	HIS
50	7	40	GLN
50	7	60	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	a	1541/1556 (99%)	310 (20%)	0
21	v	20/29 (68%)	8 (40%)	0
22	A	2870/2923 (98%)	584 (20%)	8 (0%)
23	B	114/115 (99%)	17 (14%)	1 (0%)
52	x	75/77 (97%)	21 (28%)	0
All	All	4620/4700 (98%)	940 (20%)	9 (0%)

All (940) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	a	7	G
1	a	8	G
1	a	10	G
1	a	11	A
1	a	31	U
1	a	33	A
1	a	40	G
1	a	45	G
1	a	48	C
1	a	49	C
1	a	50	U
1	a	51	A

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Mol	Chain	Res	Type
1	a	52	A
1	a	55	C
1	a	64	C
1	a	65	G
1	a	78	A
1	a	80	A
1	a	83	C
1	a	84	U
1	a	85	U
1	a	86	G
1	a	88	U
1	a	89	U
1	a	91	U
1	a	93	U
1	a	94	G
1	a	108	A
1	a	115	A
1	a	120	C
1	a	126	G
1	a	128	U
1	a	129	A
1	a	130	A
1	a	132	C
1	a	138	A
1	a	152	A
1	a	156	C
1	a	159	G
1	a	162	A
1	a	173	U
1	a	177	G
1	a	182	A
1	a	183	U
1	a	184	A
1	a	185	U
1	a	192	C
1	a	195	C
1	a	201	U
1	a	203	A
1	a	204	A
1	a	207	G
1	a	211	A
1	a	212	A

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Mol	Chain	Res	Type
1	a	213	G
1	a	216	G
1	a	218	U
1	a	220	U
1	a	221	U
1	a	222	G
1	a	249	G
1	a	253	U
1	a	255	G
1	a	258	A
1	a	259	G
1	a	261	U
1	a	274	G
1	a	275	C
1	a	287	A
1	a	297	G
1	a	310	G
1	a	316	C
1	a	329	A
1	a	336	C
1	a	338	C
1	a	353	C
1	a	355	G
1	a	360	C
1	a	362	G
1	a	375	U
1	a	380	C
1	a	382	A
1	a	392	G
1	a	396	G
1	a	405	A
1	a	406	C
1	a	414	G
1	a	419	A
1	a	420	U
1	a	421	G
1	a	429	U
1	a	432	G
1	a	437	U
1	a	451	U
1	a	454	G
1	a	456	A

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Mol	Chain	Res	Type
1	a	462	A
1	a	465	U
1	a	466	G
1	a	467	U
1	a	468	G
1	a	469	U
1	a	472	G
1	a	476	C
1	a	477	U
1	a	480	G
1	a	481	C
1	a	482	A
1	a	483	C
1	a	485	U
1	a	486	C
1	a	493	G
1	a	503	A
1	a	505	A
1	a	517	A
1	a	519	C
1	a	526	C
1	a	527	C
1	a	532	G
1	a	535	7MG
1	a	536	C
1	a	539	U
1	a	540	A
1	a	546	U
1	a	555	A
1	a	557	C
1	a	567	A
1	a	572	U
1	a	580	A
1	a	581	A
1	a	584	C
1	a	585	G
1	a	595	G
1	a	604	A
1	a	609	G
1	a	626	C
1	a	635	G
1	a	641	U

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Mol	Chain	Res	Type
1	a	646	G
1	a	649	A
1	a	650	A
1	a	659	C
1	a	660	U
1	a	661	U
1	a	662	G
1	a	673	A
1	a	681	G
1	a	693	G
1	a	695	A
1	a	711	G
1	a	715	U
1	a	729	A
1	a	741	G
1	a	742	A
1	a	756	A
1	a	763	G
1	a	769	G
1	a	785	A
1	a	795	A
1	a	801	U
1	a	802	A
1	a	803	C
1	a	807	G
1	a	817	G
1	a	820	G
1	a	823	A
1	a	825	C
1	a	829	G
1	a	836	A
1	a	840	G
1	a	851	U
1	a	852	C
1	a	854	G
1	a	855	C
1	a	862	G
1	a	864	G
1	a	881	A
1	a	911	G
1	a	925	G
1	a	931	G

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Mol	Chain	Res	Type
1	a	935	G
1	a	943	C
1	a	944	A
1	a	969	U
1	a	974	A
1	a	977	A
1	a	978	A
1	a	980	G
1	a	984	A
1	a	985	G
1	a	992	A
1	a	1000	U
1	a	1001	U
1	a	1002	G
1	a	1011	U
1	a	1013	A
1	a	1015	A
1	a	1016	A
1	a	1019	C
1	a	1024	G
1	a	1027	A
1	a	1029	A
1	a	1034	U
1	a	1035	C
1	a	1036	C
1	a	1038	C
1	a	1039	U
1	a	1040	U
1	a	1042	G
1	a	1043	G
1	a	1044	G
1	a	1046	G
1	a	1047	A
1	a	1055	A
1	a	1056	C
1	a	1057	A
1	a	1064	G
1	a	1075	G
1	a	1076	U
1	a	1097	U
1	a	1105	G
1	a	1106	U

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Mol	Chain	Res	Type
1	a	1112	A
1	a	1119	G
1	a	1121	A
1	a	1135	G
1	a	1136	U
1	a	1137	U
1	a	1138	G
1	a	1141	A
1	a	1149	G
1	a	1150	U
1	a	1151	U
1	a	1152	G
1	a	1155	C
1	a	1161	A
1	a	1168	C
1	a	1169	U
1	a	1170	G
1	a	1177	A
1	a	1178	C
1	a	1181	A
1	a	1184	G
1	a	1193	U
1	a	1194	G
1	a	1206	A
1	a	1207	A
1	a	1211	A
1	a	1222	U
1	a	1224	U
1	a	1237	A
1	a	1243	G
1	a	1248	A
1	a	1266	C
1	a	1267	A
1	a	1270	G
1	a	1284	A
1	a	1290	A
1	a	1295	A
1	a	1297	A
1	a	1298	A
1	a	1300	G
1	a	1309	A
1	a	1310	G

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Mol	Chain	Res	Type
1	a	1314	G
1	a	1315	G
1	a	1330	C
1	a	1332	C
1	a	1337	A
1	a	1341	G
1	a	1346	U
1	a	1348	G
1	a	1350	A
1	a	1355	U
1	a	1356	A
1	a	1363	G
1	a	1374	U
1	a	1378	A
1	a	1380	G
1	a	1388	C
1	a	1390	U
1	a	1391	U
1	a	1392	C
1	a	1393	C
1	a	1404	A
1	a	1408	A
1	a	1435	A
1	a	1436	A
1	a	1441	C
1	a	1452	G
1	a	1456	A
1	a	1457	A
1	a	1459	C
1	a	1460	U
1	a	1461	U
1	a	1463	U
1	a	1464	A
1	a	1498	G
1	a	1504	A
1	a	1505	G
1	a	1508	G
1	a	1510	A
1	a	1513	A
1	a	1514	A
1	a	1517	U
1	a	1528	G

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Mol	Chain	Res	Type
1	a	1540	G
1	a	1541	G
1	a	1544	C
1	a	1545	A
21	v	12	A
21	v	13	A
21	v	14	A
21	v	15	A
21	v	19	G
21	v	23	A
21	v	24	A
21	v	25	A
22	A	13	A
22	A	23	G
22	A	24	G
22	A	34	U
22	A	37	C
22	A	43	A
22	A	64	A
22	A	71	A
22	A	74	U
22	A	75	G
22	A	89	U
22	A	90	A
22	A	95	A
22	A	96	G
22	A	100	U
22	A	101	G
22	A	117	A
22	A	118	A
22	A	119	U
22	A	120	G
22	A	124	A
22	A	129	C
22	A	130	A
22	A	150	A
22	A	154	A
22	A	161	A
22	A	162	A
22	A	164	A
22	A	165	C
22	A	167	U

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Mol	Chain	Res	Type
22	A	168	A
22	A	169	G
22	A	173	A
22	A	176	A
22	A	177	G
22	A	185	A
22	A	199	A
22	A	200	A
22	A	202	A
22	A	218	G
22	A	219	A
22	A	225	A
22	A	227	G
22	A	231	A
22	A	233	U
22	A	236	A
22	A	251	G
22	A	255	G
22	A	268	A
22	A	280	C
22	A	282	A
22	A	290	U
22	A	294	G
22	A	298	U
22	A	300	G
22	A	301	U
22	A	302	A
22	A	308	C
22	A	321	U
22	A	324	A
22	A	327	G
22	A	328	G
22	A	329	A
22	A	338	G
22	A	354	A
22	A	365	A
22	A	372	A
22	A	373	A
22	A	374	U
22	A	377	U
22	A	386	C
22	A	388	A

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Mol	Chain	Res	Type
22	A	398	C
22	A	401	U
22	A	404	U
22	A	432	G
22	A	435	A
22	A	451	U
22	A	457	G
22	A	458	A
22	A	466	C
22	A	471	G
22	A	481	C
22	A	482	U
22	A	502	C
22	A	510	U
22	A	513	G
22	A	523	A
22	A	527	G
22	A	539	G
22	A	550	A
22	A	553	A
22	A	554	C
22	A	567	G
22	A	572	C
22	A	575	G
22	A	576	U
22	A	577	A
22	A	578	G
22	A	583	A
22	A	592	A
22	A	593	U
22	A	594	G
22	A	606	G
22	A	611	U
22	A	616	G
22	A	618	A
22	A	630	G
22	A	646	A
22	A	659	A
22	A	661	U
22	A	662	G
22	A	666	A
22	A	667	G

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Mol	Chain	Res	Type
22	A	679	G
22	A	682	A
22	A	683	G
22	A	690	U
22	A	698	U
22	A	699	U
22	A	700	A
22	A	715	A
22	A	731	U
22	A	745	G
22	A	773	G
22	A	774	G
22	A	775	A
22	A	781	C
22	A	783	G
22	A	792	U
22	A	807	U
22	A	809	A
22	A	810	A
22	A	813	G
22	A	820	G
22	A	822	G
22	A	824	A
22	A	827	A
22	A	829	U
22	A	830	U
22	A	834	A
22	A	837	G
22	A	839	A
22	A	847	A
22	A	850	G
22	A	851	C
22	A	857	C
22	A	872	U
22	A	873	U
22	A	888	G
22	A	891	A
22	A	904	G
22	A	910	C
22	A	911	A
22	A	919	G
22	A	923	A

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Mol	Chain	Res	Type
22	A	926	G
22	A	929	C
22	A	930	C
22	A	931	C
22	A	932	U
22	A	936	G
22	A	938	G
22	A	955	A
22	A	959	C
22	A	960	C
22	A	971	U
22	A	972	A
22	A	985	A
22	A	989	A
22	A	990	G
22	A	1001	A
22	A	1005	G
22	A	1018	A
22	A	1023	A
22	A	1026	C
22	A	1027	A
22	A	1033	G
22	A	1039	C
22	A	1040	A
22	A	1053	A
22	A	1055	A
22	A	1056	U
22	A	1057	A
22	A	1060	U
22	A	1061	G
22	A	1069	G
22	A	1070	A
22	A	1071	A
22	A	1077	U
22	A	1090	A
22	A	1091	G
22	A	1096	C
22	A	1102	U
22	A	1105	U
22	A	1106	G
22	A	1108	C
22	A	1109	U

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Mol	Chain	Res	Type
22	A	1110	U
22	A	1111	A
22	A	1113	A
22	A	1114	A
22	A	1115	G
22	A	1116	C
22	A	1117	A
22	A	1120	C
22	A	1122	U
22	A	1124	A
22	A	1127	U
22	A	1128	A
22	A	1129	A
22	A	1131	G
22	A	1132	A
22	A	1133	G
22	A	1137	G
22	A	1138	U
22	A	1139	A
22	A	1140	A
22	A	1143	G
22	A	1145	U
22	A	1146	C
22	A	1147	A
22	A	1151	G
22	A	1152	U
22	A	1153	C
22	A	1154	G
22	A	1155	A
22	A	1156	G
22	A	1171	A
22	A	1172	A
22	A	1174	U
22	A	1176	U
22	A	1177	A
22	A	1178	C
22	A	1179	C
22	A	1186	A
22	A	1201	G
22	A	1211	G
22	A	1215	U
22	A	1220	A

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Mol	Chain	Res	Type
22	A	1250	G
22	A	1258	A
22	A	1276	G
22	A	1278	G
22	A	1288	G
22	A	1294	G
22	A	1295	C
22	A	1306	A
22	A	1309	G
22	A	1310	A
22	A	1323	A
22	A	1326	C
22	A	1337	A
22	A	1338	U
22	A	1339	U
22	A	1349	U
22	A	1350	U
22	A	1358	A
22	A	1375	G
22	A	1377	U
22	A	1378	U
22	A	1387	C
22	A	1389	U
22	A	1402	A
22	A	1405	G
22	A	1416	U
22	A	1421	A
22	A	1432	A
22	A	1435	C
22	A	1436	C
22	A	1437	U
22	A	1450	A
22	A	1463	A
22	A	1464	U
22	A	1465	G
22	A	1471	A
22	A	1472	C
22	A	1473	G
22	A	1489	A
22	A	1490	G
22	A	1491	C
22	A	1492	G

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Mol	Chain	Res	Type
22	A	1494	G
22	A	1495	C
22	A	1496	G
22	A	1499	U
22	A	1502	A
22	A	1503	U
22	A	1504	U
22	A	1505	G
22	A	1506	C
22	A	1510	U
22	A	1516	C
22	A	1517	A
22	A	1519	U
22	A	1525	U
22	A	1533	A
22	A	1536	C
22	A	1537	A
22	A	1540	U
22	A	1541	C
22	A	1550	G
22	A	1551	U
22	A	1552	U
22	A	1553	A
22	A	1555	G
22	A	1559	G
22	A	1561	G
22	A	1570	G
22	A	1575	A
22	A	1576	A
22	A	1577	G
22	A	1590	C
22	A	1592	A
22	A	1600	A
22	A	1601	U
22	A	1605	A
22	A	1606	C
22	A	1613	G
22	A	1614	A
22	A	1616	A
22	A	1625	U
22	A	1630	A
22	A	1632	A

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Mol	Chain	Res	Type
22	A	1634	A
22	A	1635	A
22	A	1636	U
22	A	1639	G
22	A	1651	C
22	A	1652	A
22	A	1662	A
22	A	1683	U
22	A	1686	G
22	A	1690	A
22	A	1691	G
22	A	1692	C
22	A	1696	C
22	A	1718	G
22	A	1719	C
22	A	1737	U
22	A	1738	C
22	A	1740	G
22	A	1756	U
22	A	1757	U
22	A	1759	G
22	A	1764	A
22	A	1768	C
22	A	1772	G
22	A	1777	G
22	A	1785	G
22	A	1790	G
22	A	1791	G
22	A	1800	A
22	A	1803	G
22	A	1808	U
22	A	1811	A
22	A	1813	A
22	A	1815	C
22	A	1819	G
22	A	1826	G
22	A	1827	C
22	A	1828	U
22	A	1837	A
22	A	1839	G
22	A	1843	U
22	A	1844	G

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Mol	Chain	Res	Type
22	A	1847	U
22	A	1856	A
22	A	1893	A
22	A	1895	C
22	A	1896	U
22	A	1897	U
22	A	1899	U
22	A	1900	G
22	A	1902	G
22	A	1909	C
22	A	1930	G
22	A	1933	G
22	A	1937	G
22	A	1939	A
22	A	1940	A
22	A	1941	C
22	A	1943	A
22	A	1947	OMC
22	A	1956	G
22	A	1957	G
22	A	1963	A
22	A	1964	A
22	A	1965	A
22	A	1966	5MU
22	A	1967	U
22	A	1975	G
22	A	1982	U
22	A	1990	C
22	A	1991	G
22	A	1993	A
22	A	1994	C
22	A	1997	A
22	A	1998	A
22	A	1999	G
22	A	2009	U
22	A	2018	U
22	A	2020	U
22	A	2033	C
22	A	2050	A
22	A	2058	A
22	A	2059	G
22	A	2060	A

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Mol	Chain	Res	Type
22	A	2063	C
22	A	2070	C
22	A	2082	C
22	A	2083	G
22	A	2087	A
22	A	2088	G
22	A	2089	A
22	A	2094	G
22	A	2096	G
22	A	2097	G
22	A	2114	G
22	A	2120	G
22	A	2128	G
22	A	2132	A
22	A	2135	U
22	A	2136	U
22	A	2137	G
22	A	2138	U
22	A	2139	A
22	A	2140	C
22	A	2142	G
22	A	2143	G
22	A	2144	A
22	A	2145	U
22	A	2146	A
22	A	2147	G
22	A	2150	A
22	A	2153	A
22	A	2157	U
22	A	2158	U
22	A	2160	G
22	A	2161	A
22	A	2162	A
22	A	2164	C
22	A	2165	G
22	A	2166	U
22	A	2168	A
22	A	2169	G
22	A	2172	C
22	A	2173	U
22	A	2174	A
22	A	2175	G

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Mol	Chain	Res	Type
22	A	2176	C
22	A	2179	A
22	A	2183	G
22	A	2184	G
22	A	2185	A
22	A	2186	G
22	A	2188	C
22	A	2190	C
22	A	2191	U
22	A	2194	U
22	A	2195	G
22	A	2196	G
22	A	2198	A
22	A	2200	A
22	A	2201	C
22	A	2205	C
22	A	2208	A
22	A	2211	U
22	A	2214	G
22	A	2215	U
22	A	2217	G
22	A	2220	U
22	A	2225	A
22	A	2230	G
22	A	2231	C
22	A	2240	U
22	A	2241	C
22	A	2252	A
22	A	2253	C
22	A	2265	G
22	A	2266	G
22	A	2296	A
22	A	2305	A
22	A	2309	G
22	A	2310	C
22	A	2314	A
22	A	2321	C
22	A	2332	U
22	A	2335	G
22	A	2347	A
22	A	2349	A
22	A	2352	G

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Mol	Chain	Res	Type
22	A	2353	U
22	A	2361	U
22	A	2362	A
22	A	2363	A
22	A	2374	C
22	A	2377	C
22	A	2386	C
22	A	2404	A
22	A	2406	G
22	A	2410	G
22	A	2412	C
22	A	2418	G
22	A	2429	U
22	A	2433	C
22	A	2446	U
22	A	2450	U
22	A	2452	A
22	A	2456	G
22	A	2457	A
22	A	2467	C
22	A	2468	C
22	A	2472	2MG
22	A	2475	A
22	A	2486	A
22	A	2501	U
22	A	2502	C
22	A	2505	A
22	A	2518	U
22	A	2525	OMC
22	A	2528	C
22	A	2529	G
22	A	2531	U
22	A	2532	G
22	A	2533	U
22	A	2541	U
22	A	2545	A
22	A	2547	C
22	A	2556	G
22	A	2562	G
22	A	2565	C
22	A	2569	A
22	A	2593	A

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Mol	Chain	Res	Type
22	A	2594	G
22	A	2600	C
22	A	2609	G
22	A	2624	G
22	A	2628	C
22	A	2629	A
22	A	2635	G
22	A	2636	U
22	A	2637	C
22	A	2640	U
22	A	2642	U
22	A	2663	U
22	A	2666	A
22	A	2672	G
22	A	2673	C
22	A	2690	G
22	A	2697	G
22	A	2709	U
22	A	2716	U
22	A	2727	G
22	A	2740	A
22	A	2741	G
22	A	2753	U
22	A	2754	G
22	A	2760	A
22	A	2762	G
22	A	2769	G
22	A	2775	A
22	A	2784	A
22	A	2792	A
22	A	2793	G
22	A	2796	C
22	A	2805	A
22	A	2806	U
22	A	2817	A
22	A	2820	U
22	A	2827	A
22	A	2833	U
22	A	2840	A
22	A	2841	A
22	A	2853	U
22	A	2863	G

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Mol	Chain	Res	Type
22	A	2887	G
22	A	2893	A
22	A	2900	C
22	A	2903	A
22	A	2904	U
22	A	2906	G
22	A	2911	A
22	A	2913	G
23	B	2	C
23	B	10	U
23	B	11	A
23	B	23	U
23	B	24	C
23	B	39	G
23	B	41	C
23	B	43	A
23	B	52	G
23	B	64	A
23	B	87	C
23	B	88	G
23	B	90	U
23	B	97	G
23	B	102	G
23	B	106	G
23	B	108	U
52	x	2	G
52	x	5	G
52	x	8	4SU
52	x	9	G
52	x	16	C
52	x	17	C
52	x	17(A)	U
52	x	18	G
52	x	19	G
52	x	20	H2U
52	x	21	A
52	x	26	G
52	x	43	A
52	x	46	7MG
52	x	47	U
52	x	49	G
52	x	56	C

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Mol	Chain	Res	Type
52	x	58	A
52	x	61	C
52	x	74	C
52	x	75	C

All (9) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
22	A	179	A
22	A	327	G
22	A	328	G
22	A	971	U
22	A	1503	U
22	A	1550	G
22	A	2216	U
22	A	2783	U
23	B	23	U

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

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
52	PSU	x	55	52	22,22,22	1.25	3 (13%)	29,33,33	2.75	11 (37%)
1	MA6	a	1529	1	18,26,27	1.04	2 (11%)	19,38,41	3.12	2 (10%)
52	H2U	x	20	52	22,22,22	0.94	2 (9%)	28,33,33	2.84	6 (21%)
52	7MG	x	46	52	26,27,27	3.49	10 (38%)	36,42,42	2.74	15 (41%)
52	4SU	x	8	52	22,22,22	1.71	4 (18%)	33,33,33	2.82	13 (39%)
22	2MA	A	2530	54,53,22	19,25,26	3.32	7 (36%)	21,37,40	2.27	4 (19%)
52	31H	x	76	53,52	28,34,35	4.57	13 (46%)	23,47,50	2.80	6 (26%)
52	OMC	x	32	52	23,23,23	2.73	8 (34%)	33,34,34	2.28	8 (24%)
22	5MU	A	1966	54,22	19,22,23	4.82	7 (36%)	28,32,35	3.83	9 (32%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
1	MA6	a	1530	1	18,26,27	1.03	2 (11%)	19,38,41	3.52	2 (10%)
22	OMG	A	2278	52,22	18,26,27	2.31	7 (38%)	19,38,41	1.51	4 (21%)
1	4OC	a	1412	1	20,23,24	3.07	8 (40%)	26,32,35	1.04	2 (7%)
52	5MU	x	54	52	23,23,23	4.53	7 (30%)	35,35,35	3.83	15 (42%)
22	2MG	A	2472	22	18,26,27	2.25	7 (38%)	16,38,41	1.66	4 (25%)
1	7MG	a	535	1	22,26,27	3.80	10 (45%)	29,39,42	2.07	9 (31%)
22	OMC	A	1947	22	19,22,23	2.84	8 (42%)	26,31,34	0.88	1 (3%)
1	2MG	a	1527	1	18,26,27	2.37	7 (38%)	16,38,41	1.43	3 (18%)
22	OMC	A	2525	22	19,22,23	2.75	7 (36%)	26,31,34	0.99	1 (3%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
52	PSU	x	55	52	-	4/10/26/26	0/2/2/2
1	MA6	a	1529	1	-	1/7/29/30	0/3/3/3
52	H2U	x	20	52	-	4/10/39/39	0/2/2/2
52	7MG	x	46	52	-	5/10/38/38	0/3/3/3
52	4SU	x	8	52	-	1/10/26/26	0/2/2/2
22	2MA	A	2530	54,53,22	-	2/3/25/26	0/3/3/3
52	31H	x	76	53,52	-	14/18/40/41	0/3/3/3
52	OMC	x	32	52	-	4/12/28/28	0/2/2/2
22	5MU	A	1966	54,22	-	2/7/25/26	0/2/2/2
1	MA6	a	1530	1	-	2/7/29/30	0/3/3/3
22	OMG	A	2278	52,22	-	0/5/27/28	0/3/3/3
1	4OC	a	1412	1	-	2/9/29/30	0/2/2/2
52	5MU	x	54	52	-	2/10/26/26	0/2/2/2
22	2MG	A	2472	22	-	2/5/27/28	0/3/3/3
1	7MG	a	535	1	-	2/7/37/38	0/3/3/3
22	OMC	A	1947	22	-	2/9/27/28	0/2/2/2
1	2MG	a	1527	1	-	0/5/27/28	0/3/3/3
22	OMC	A	2525	22	-	2/9/27/28	0/2/2/2

All (119) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
52	x	76	31H	C4'-C3'	-13.83	1.28	1.52
52	x	54	5MU	C2-N1	11.56	1.57	1.38
52	x	54	5MU	C6-N1	11.11	1.57	1.38
22	A	1966	5MU	C6-N1	10.80	1.56	1.38
22	A	1966	5MU	C2-N1	10.59	1.55	1.38
52	x	54	5MU	C4-C5	9.93	1.61	1.44
52	x	76	31H	O4'-C4'	9.70	1.66	1.45
22	A	1966	5MU	C4-C5	9.31	1.60	1.44
52	x	46	7MG	C8-N9	9.24	1.51	1.46
1	a	535	7MG	C8-N9	9.04	1.51	1.46
22	A	2530	2MA	C4-N3	8.89	1.49	1.35
52	x	76	31H	O4'-C1'	-8.26	1.29	1.41
52	x	76	31H	C3'-N3'	8.21	1.58	1.45
1	a	535	7MG	C5-N7	8.12	1.45	1.35
52	x	46	7MG	C5-N7	8.09	1.44	1.35
22	A	1966	5MU	C4-N3	-7.82	1.24	1.38
52	x	54	5MU	C4-N3	-7.43	1.25	1.38
22	A	1966	5MU	C6-C5	6.68	1.45	1.34
52	x	54	5MU	C6-C5	6.41	1.45	1.34
52	x	32	OMC	C2-N3	6.27	1.49	1.36
1	a	1412	4OC	C4-N3	6.27	1.43	1.32
22	A	2530	2MA	C2-N3	6.25	1.45	1.34
52	x	76	31H	C-N3'	6.22	1.47	1.34
1	a	1412	4OC	C6-C5	6.22	1.49	1.35
22	A	1947	OMC	C2-N3	5.98	1.48	1.36
22	A	1947	OMC	C6-C5	5.93	1.48	1.35
52	x	76	31H	CN-N	5.91	1.53	1.33
52	x	32	OMC	C6-C5	5.87	1.48	1.35
52	x	46	7MG	C2-N3	5.85	1.47	1.33
22	A	2525	OMC	C2-N3	5.84	1.48	1.36
22	A	2530	2MA	C6-N1	5.82	1.44	1.33
1	a	535	7MG	C4-N9	5.82	1.44	1.37
1	a	535	7MG	C2-N3	5.81	1.47	1.33
1	a	1412	4OC	C2-N3	5.79	1.48	1.36
22	A	2530	2MA	C2-N1	5.63	1.44	1.34
52	x	46	7MG	C4-N9	5.54	1.44	1.37
1	a	535	7MG	C4-N3	5.54	1.47	1.34
22	A	2525	OMC	C6-C5	5.46	1.47	1.35
52	x	46	7MG	C4-N3	5.41	1.47	1.34
1	a	1527	2MG	C2-N2	5.16	1.44	1.33
52	x	32	OMC	C4-N3	5.00	1.44	1.34
22	A	2278	OMG	C2-N3	5.00	1.45	1.33
1	a	1412	4OC	C4-N4	4.88	1.45	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
52	x	46	7MG	C2-N2	4.87	1.45	1.34
52	x	32	OMC	C2-N1	4.85	1.50	1.40
52	x	32	OMC	C4-N4	4.79	1.45	1.33
1	a	535	7MG	C2-N2	4.77	1.45	1.34
22	A	2472	2MG	C2-N2	4.70	1.43	1.33
22	A	1947	OMC	C4-N4	4.70	1.45	1.33
1	a	1527	2MG	C4-N3	4.61	1.48	1.37
52	x	8	4SU	C4-S4	-4.61	1.59	1.68
22	A	2525	OMC	C4-N4	4.55	1.44	1.33
22	A	2472	2MG	C4-N3	4.53	1.48	1.37
22	A	2278	OMG	C4-N3	4.49	1.48	1.37
22	A	1947	OMC	C4-N3	4.47	1.43	1.34
1	a	1527	2MG	C2-N1	4.40	1.43	1.36
52	x	76	31H	O2'-C2'	-4.39	1.32	1.43
22	A	2525	OMC	C4-N3	4.38	1.43	1.34
1	a	1412	4OC	C2-N1	4.34	1.49	1.40
22	A	2525	OMC	C2-N1	4.28	1.49	1.40
22	A	1947	OMC	C2-N1	4.21	1.49	1.40
52	x	76	31H	C6-N6	3.93	1.48	1.34
52	x	8	4SU	C5-C4	-3.86	1.37	1.42
1	a	535	7MG	C5-C6	3.77	1.53	1.43
1	a	1412	4OC	C5-C4	3.73	1.48	1.40
1	a	535	7MG	C2-N1	3.61	1.46	1.37
52	x	46	7MG	C5-C6	3.61	1.52	1.43
22	A	2472	2MG	C2-N1	3.60	1.42	1.36
52	x	46	7MG	C2-N1	3.59	1.46	1.37
22	A	2278	OMG	C6-N1	3.35	1.42	1.37
22	A	2278	OMG	C2-N2	3.29	1.42	1.34
1	a	1412	4OC	C6-N1	3.24	1.45	1.38
22	A	2472	2MG	C5-C4	-3.23	1.34	1.43
1	a	1527	2MG	C6-N1	3.21	1.42	1.37
52	x	76	31H	C2'-C1'	3.20	1.58	1.53
22	A	1966	5MU	O4-C4	-3.15	1.17	1.23
52	x	8	4SU	C4-N3	-3.15	1.34	1.37
52	x	32	OMC	C6-N1	3.14	1.45	1.38
52	x	46	7MG	C6-N1	3.08	1.44	1.38
1	a	535	7MG	C6-N1	3.06	1.44	1.38
52	x	55	PSU	C6-C5	3.05	1.38	1.35
52	x	76	31H	C2'-C3'	3.01	1.59	1.53
22	A	1947	OMC	C6-N1	3.01	1.45	1.38
52	x	54	5MU	O4-C4	-2.98	1.17	1.23
22	A	2278	OMG	C5-C4	-2.98	1.35	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	a	1527	2MG	C5-C6	2.96	1.53	1.47
22	A	2278	OMG	O6-C6	-2.92	1.17	1.23
1	a	1412	4OC	O2-C2	-2.89	1.18	1.23
22	A	1966	5MU	O2-C2	-2.88	1.17	1.23
22	A	2525	OMC	O2-C2	-2.86	1.18	1.23
22	A	2472	2MG	O6-C6	-2.85	1.17	1.23
1	a	1527	2MG	C5-C4	-2.84	1.35	1.43
1	a	1530	MA6	C5-C4	-2.83	1.33	1.40
22	A	2525	OMC	C6-N1	2.82	1.44	1.38
1	a	1529	MA6	C5-C4	-2.78	1.33	1.40
52	x	55	PSU	C4-N3	-2.78	1.33	1.38
22	A	1947	OMC	O2-C2	-2.76	1.18	1.23
52	x	32	OMC	O2-C2	-2.72	1.18	1.23
52	x	20	H2U	C2-N3	-2.70	1.33	1.38
22	A	2530	2MA	C6-C5	2.69	1.53	1.43
52	x	46	7MG	O6-C6	-2.62	1.18	1.23
1	a	535	7MG	O6-C6	-2.60	1.18	1.23
52	x	54	5MU	O2-C2	-2.55	1.18	1.23
22	A	2472	2MG	C6-N1	2.52	1.41	1.37
22	A	2472	2MG	C5-C6	2.50	1.52	1.47
22	A	2278	OMG	C5-C6	2.50	1.52	1.47
52	x	76	31H	CB-CG	2.48	1.61	1.51
52	x	8	4SU	C2-N1	2.46	1.42	1.38
52	x	76	31H	O-C	-2.43	1.18	1.23
22	A	2530	2MA	C6-N6	-2.41	1.25	1.34
22	A	2530	2MA	C5-C4	-2.31	1.34	1.40
1	a	1529	MA6	C2-N3	2.30	1.35	1.32
52	x	76	31H	C6-C5	-2.24	1.35	1.43
1	a	1527	2MG	O6-C6	-2.22	1.18	1.23
52	x	32	OMC	C5-C4	2.21	1.48	1.42
52	x	55	PSU	C2-N3	-2.18	1.33	1.37
52	x	20	H2U	C4-N3	-2.17	1.33	1.37
22	A	1947	OMC	C5-C4	2.09	1.47	1.42
1	a	1530	MA6	C2-N3	2.05	1.35	1.32

All (115) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	a	1530	MA6	N1-C6-N6	-13.63	102.72	117.06
22	A	1966	5MU	C5-C4-N3	12.76	126.20	115.31
52	x	54	5MU	C5-C4-N3	12.34	125.84	115.31
1	a	1529	MA6	N1-C6-N6	-12.04	104.38	117.06

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	A	1966	5MU	C5-C6-N1	-11.02	112.00	123.34
52	x	20	H2U	OP3-P-O5'	-10.38	79.11	106.73
52	x	54	5MU	C5-C6-N1	-9.40	113.67	123.34
52	x	20	H2U	C4-N3-C2	-8.06	119.10	125.79
52	x	76	31H	C5-C6-N6	7.89	132.35	120.35
52	x	55	PSU	OP3-P-O5'	-7.53	86.69	106.73
52	x	8	4SU	OP3-P-O5'	-6.71	88.88	106.73
52	x	32	OMC	OP3-P-OP1	-6.66	84.60	110.68
1	a	1530	MA6	N3-C2-N1	-6.27	118.88	128.68
22	A	2530	2MA	C1'-N9-C4	6.20	137.54	126.64
52	x	54	5MU	OP3-P-O5'	-6.12	90.44	106.73
22	A	2530	2MA	C2-N3-C4	6.01	120.41	115.52
52	x	54	5MU	OP3-P-OP1	-6.00	87.21	110.68
52	x	76	31H	N3-C2-N1	-5.96	119.36	128.68
52	x	46	7MG	OP3-P-OP1	-5.95	87.39	110.68
52	x	46	7MG	OP3-P-OP2	-5.92	85.01	107.64
52	x	46	7MG	OP3-P-O5'	-5.85	91.17	106.73
1	a	1529	MA6	N3-C2-N1	-5.85	119.54	128.68
52	x	55	PSU	N1-C2-N3	5.67	121.55	115.13
22	A	1966	5MU	O4-C4-C5	-5.65	118.36	124.90
52	x	32	OMC	OP3-P-OP2	-5.50	86.61	107.64
22	A	1966	5MU	C4-N3-C2	-5.48	120.26	127.35
52	x	54	5MU	OP3-P-OP2	-5.47	86.73	107.64
52	x	76	31H	C1'-N9-C4	-5.47	117.03	126.64
52	x	8	4SU	C4-N3-C2	-5.42	122.07	127.34
52	x	8	4SU	C5-C4-N3	5.32	119.63	114.69
52	x	8	4SU	C5-C4-S4	-5.32	117.61	124.47
52	x	54	5MU	O4-C4-C5	-5.26	118.81	124.90
52	x	32	OMC	OP3-P-O5'	-5.23	92.80	106.73
52	x	76	31H	N6-C6-N1	-5.21	107.75	118.57
1	a	535	7MG	C5-C6-N1	5.17	120.11	110.99
52	x	46	7MG	C5-C6-N1	5.17	120.11	110.99
52	x	46	7MG	OP2-P-OP1	5.17	130.91	110.68
52	x	8	4SU	OP2-P-OP1	5.10	130.63	110.68
22	A	1966	5MU	N3-C2-N1	5.02	121.56	114.89
52	x	55	PSU	OP2-P-OP1	4.85	129.66	110.68
52	x	54	5MU	C4-N3-C2	-4.79	121.15	127.35
52	x	54	5MU	OP2-P-OP1	4.72	129.16	110.68
52	x	32	OMC	OP2-P-OP1	4.66	128.92	110.68
1	a	535	7MG	C2-N3-C4	4.63	120.55	112.30
52	x	54	5MU	N3-C2-N1	4.54	120.92	114.89
52	x	46	7MG	C2-N3-C4	4.50	120.32	112.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
52	x	8	4SU	OP3-P-OP1	-4.48	93.13	110.68
1	a	535	7MG	C5-C4-N3	-4.25	120.03	128.13
52	x	8	4SU	C1'-N1-C2	4.17	125.12	117.57
52	x	55	PSU	OP3-P-OP1	-4.15	94.43	110.68
22	A	2472	2MG	C5-C6-N1	4.10	121.20	113.95
52	x	54	5MU	C5M-C5-C4	4.10	123.28	118.77
52	x	46	7MG	C5-C4-N3	-4.03	120.46	128.13
52	x	54	5MU	C5M-C5-C6	-3.95	117.58	122.85
52	x	55	PSU	C4-N3-C2	-3.83	120.82	126.34
22	A	2530	2MA	N3-C2-N1	-3.71	118.95	125.73
52	x	8	4SU	N3-C2-N1	3.67	119.77	114.89
22	A	2278	OMG	C5-C6-N1	3.58	120.27	113.95
52	x	20	H2U	OP3-P-OP1	3.57	124.67	110.68
52	x	55	PSU	OP3-P-OP2	-3.46	94.40	107.64
52	x	8	4SU	O5'-P-OP1	3.44	116.14	106.47
1	a	535	7MG	C5-C4-N9	3.38	110.73	106.35
52	x	46	7MG	C5-C4-N9	3.34	110.68	106.35
1	a	1527	2MG	C5-C6-N1	3.31	119.80	113.95
22	A	2472	2MG	CM2-N2-C2	-3.26	116.65	123.86
52	x	32	OMC	O5'-P-OP1	3.24	115.56	106.47
22	A	2278	OMG	C2-N1-C6	-3.22	119.16	125.10
52	x	55	PSU	OP2-P-O5'	3.18	115.19	106.73
52	x	54	5MU	O5'-P-OP1	3.17	115.38	106.47
52	x	8	4SU	C6-N1-C2	-3.16	116.95	120.99
52	x	54	5MU	OP2-P-O5'	3.14	115.09	106.73
52	x	32	OMC	OP2-P-O5'	3.13	115.06	106.73
52	x	20	H2U	O5'-P-OP1	-3.05	97.93	106.47
52	x	8	4SU	OP3-P-OP2	-3.03	96.06	107.64
52	x	55	PSU	O2-C2-N1	-2.96	119.53	122.79
52	x	46	7MG	OP2-P-O5'	2.96	114.62	106.73
22	A	2530	2MA	CM2-C2-N1	2.95	121.76	117.15
52	x	55	PSU	O5'-P-OP1	2.94	114.73	106.47
22	A	1966	5MU	O2-C2-N1	-2.92	118.90	122.79
1	a	535	7MG	C2-N1-C6	-2.87	119.87	125.10
52	x	46	7MG	C4-C5-N7	2.86	109.49	105.53
52	x	55	PSU	C6-C5-C4	-2.84	116.21	118.20
52	x	46	7MG	C2-N1-C6	-2.82	119.96	125.10
1	a	535	7MG	C4-C5-N7	2.75	109.35	105.53
1	a	1412	4OC	O2-C2-N3	-2.68	117.97	122.33
52	x	32	OMC	O2-C2-N3	-2.68	117.98	122.33
52	x	46	7MG	O5'-P-OP1	2.67	113.96	106.47
1	a	535	7MG	N9-C8-N7	2.67	107.19	103.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	a	1527	2MG	C8-N7-C5	2.66	108.06	102.99
1	a	1527	2MG	CM2-N2-C2	-2.66	117.99	123.86
52	x	8	4SU	S4-C4-N3	2.59	122.76	120.21
22	A	2278	OMG	C8-N7-C5	2.58	107.90	102.99
1	a	535	7MG	N9-C4-N3	2.52	129.24	125.47
22	A	2472	2MG	C8-N7-C5	2.51	107.77	102.99
52	x	76	31H	CE-SD-CG	2.49	108.95	100.40
52	x	54	5MU	O4-C4-N3	-2.49	115.35	120.12
52	x	46	7MG	N9-C8-N7	2.48	106.93	103.38
22	A	2525	OMC	O2-C2-N3	-2.46	118.33	122.33
52	x	20	H2U	C5-C6-N1	-2.44	103.57	111.61
22	A	1966	5MU	O4-C4-N3	-2.44	115.44	120.12
22	A	2472	2MG	O6-C6-C5	-2.43	119.63	124.37
22	A	1966	5MU	C5M-C5-C6	-2.36	119.70	122.85
1	a	1412	4OC	C6-C5-C4	2.36	119.84	116.96
52	x	46	7MG	O6-C6-C5	-2.35	121.78	127.54
52	x	32	OMC	C1'-N1-C2	2.30	123.55	118.42
52	x	46	7MG	N9-C4-N3	2.27	128.86	125.47
52	x	20	H2U	OP2-P-OP1	2.23	119.43	110.68
52	x	55	PSU	O3'-C3'-C4'	2.22	117.47	111.05
1	a	535	7MG	O6-C6-C5	-2.20	122.15	127.54
22	A	1966	5MU	C6-C5-C4	2.17	119.85	118.03
52	x	8	4SU	OP2-P-O5'	2.15	112.45	106.73
22	A	2278	OMG	O6-C6-C5	-2.15	120.17	124.37
52	x	76	31H	O4'-C1'-C2'	-2.15	103.79	106.93
22	A	1947	OMC	O2-C2-N3	-2.12	118.88	122.33
52	x	54	5MU	C6-N1-C2	-2.00	119.27	121.30

There are no chirality outliers.

All (51) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	a	1530	MA6	O4'-C4'-C5'-O5'
22	A	1947	OMC	O4'-C4'-C5'-O5'
52	x	20	H2U	O4'-C4'-C5'-O5'
52	x	32	OMC	C5'-O5'-P-OP1
52	x	46	7MG	C5'-O5'-P-OP3
52	x	54	5MU	C5'-O5'-P-OP3
52	x	55	PSU	O4'-C1'-C5-C4
52	x	55	PSU	O4'-C1'-C5-C6
52	x	55	PSU	C5'-O5'-P-OP1
52	x	55	PSU	C5'-O5'-P-OP3

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Mol	Chain	Res	Type	Atoms
52	x	76	31H	C3'-C4'-C5'-O5'
52	x	76	31H	C-CA-N-CN
52	x	76	31H	CB-CA-N-CN
52	x	76	31H	C-CA-CB-CG
52	x	76	31H	N-CA-CB-CG
52	x	76	31H	OCN-CN-N-CA
1	a	535	7MG	C3'-C4'-C5'-O5'
1	a	1412	4OC	O4'-C4'-C5'-O5'
1	a	1530	MA6	C3'-C4'-C5'-O5'
22	A	1947	OMC	C3'-C4'-C5'-O5'
22	A	1966	5MU	C3'-C4'-C5'-O5'
22	A	1966	5MU	O4'-C4'-C5'-O5'
52	x	76	31H	O4'-C4'-C5'-O5'
1	a	535	7MG	O4'-C4'-C5'-O5'
1	a	1412	4OC	C3'-C4'-C5'-O5'
52	x	20	H2U	C2'-C1'-N1-C2
22	A	2472	2MG	C3'-C4'-C5'-O5'
22	A	2525	OMC	C3'-C4'-C5'-O5'
52	x	46	7MG	C3'-C4'-C5'-O5'
52	x	76	31H	CB-CG-SD-CE
22	A	2525	OMC	O4'-C4'-C5'-O5'
52	x	46	7MG	O4'-C4'-C5'-O5'
52	x	20	H2U	C2'-C1'-N1-C6
1	a	1529	MA6	C5-C6-N6-C9
52	x	46	7MG	C5'-O5'-P-OP1
52	x	76	31H	O-C-CA-N
52	x	76	31H	N3'-C-CA-N
52	x	76	31H	C4'-C5'-O5'-P
52	x	76	31H	O-C-CA-CB
22	A	2472	2MG	O4'-C4'-C5'-O5'
52	x	20	H2U	C3'-C4'-C5'-O5'
52	x	32	OMC	C3'-C4'-C5'-O5'
52	x	76	31H	N3'-C-CA-CB
52	x	8	4SU	C5'-O5'-P-OP1
52	x	46	7MG	C4'-C5'-O5'-P
22	A	2530	2MA	O4'-C4'-C5'-O5'
52	x	32	OMC	O4'-C4'-C5'-O5'
52	x	32	OMC	C5'-O5'-P-OP3
52	x	54	5MU	C5'-O5'-P-OP1
22	A	2530	2MA	C4'-C5'-O5'-P
52	x	76	31H	C4'-C3'-N3'-C

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 288 ligands modelled in this entry, 288 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)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
47	4	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	4	53:GLU	C	57:GLU	N	9.89

6 Map visualisation

This section contains visualisations of the EMDB entry EMD-10791. 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

This section was not generated.

6.2 Central slices

This section was not generated.

6.3 Largest variance slices

This section was not generated.

6.4 Orthogonal standard-deviation projections (False-color)

This section was not generated.

6.5 Orthogonal surface views

This section was not generated.

6.6 Mask visualisation

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

This section was not generated.

7.2 Volume estimate versus contour level

This section was not generated.

7.3 Rotationally averaged power spectrum

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

8 Fourier-Shell correlation (i)

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

9 Map-model fit

This section was not generated.