



wwPDB X-ray Structure Validation Summary Report ⓘ

Sep 14, 2023 – 03:37 PM EDT

PDB ID : 4V4S
Title : Crystal structure of the whole ribosomal complex.
Authors : Petry, S.; Brodersen, D.E.; Murphy IV, F.V.; Dunham, C.M.; Selmer, M.;
Tarry, M.J.; Kelley, A.C.; Ramakrishnan, V.
Deposited on : 2005-10-12
Resolution : 6.76 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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/XrayValidationReportHelp>

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:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35.1
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35.1

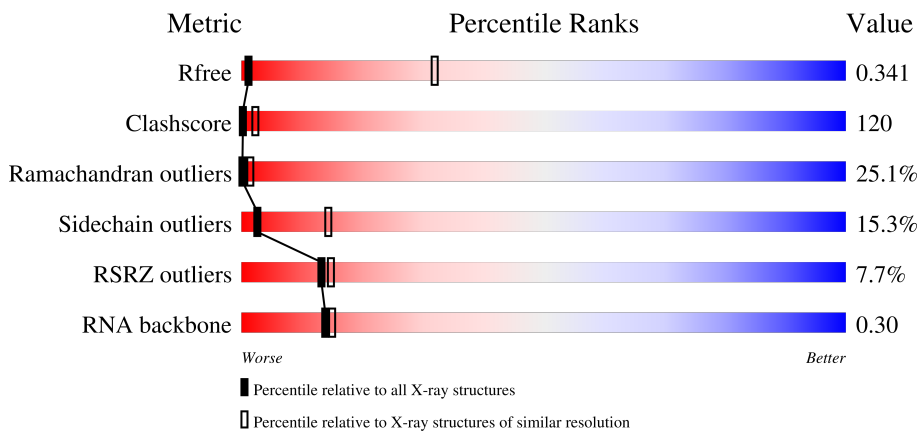
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 6.76 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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1002 (9.50-3.90)
Clashscore	141614	1066 (9.50-3.90)
Ramachandran outliers	138981	1000 (9.50-3.90)
Sidechain outliers	138945	1000 (9.50-3.86)
RSRZ outliers	127900	1004 (9.50-3.80)
RNA backbone	3102	1078 (10.00-3.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	AA	1522	
2	AV	76	
3	AW	76	
4	AX	18	

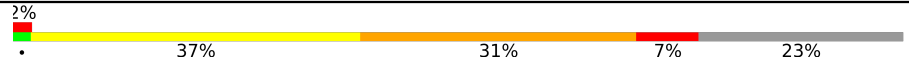

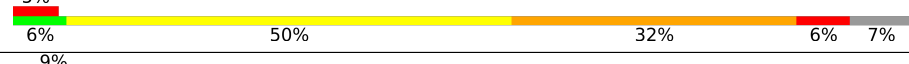
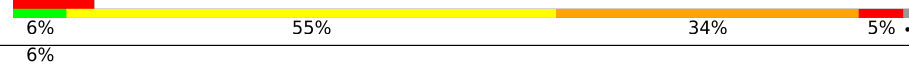






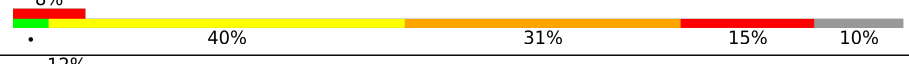
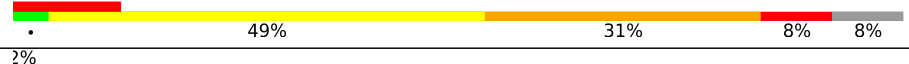
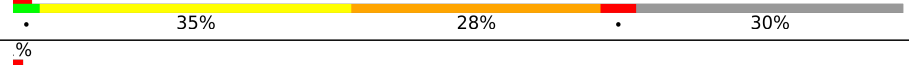

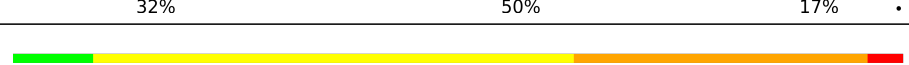
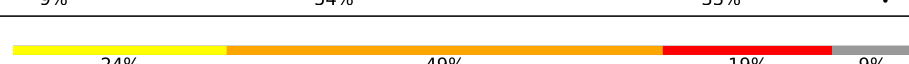
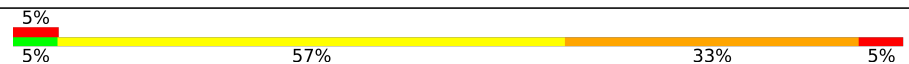


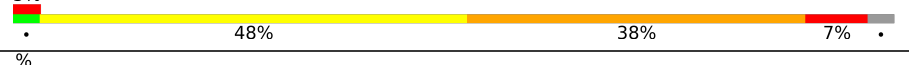
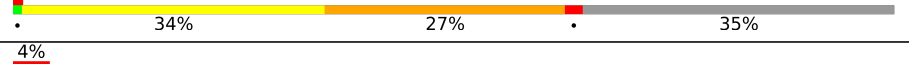




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Mol	Chain	Length	Quality of chain
5	AB	256	
6	AC	239	
7	AD	209	
8	AE	162	
9	AF	101	
10	AG	156	
11	AH	138	
12	AI	128	
13	AJ	105	
14	AK	129	
15	AL	135	
16	AM	126	
17	AN	61	
18	AO	89	
19	AP	88	
20	AQ	105	
21	AR	88	
22	AS	93	
23	AT	106	
24	AU	27	
25	AY	365	
26	BB	123	
27	BA	2916	
28	BD	173	
29	BE	338	

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Mol	Chain	Length	Quality of chain
30	BF	246	
31	BG	176	
32	BH	177	
33	BI	149	
34	BN	145	
35	BO	122	
36	BP	164	
37	BQ	138	
38	BS	186	
39	BT	66	
40	BW	113	
41	BX	84	
42	BY	119	
43	BZ	253	
44	BR	118	
45	BU	118	
46	BV	100	
47	B2	70	
48	B3	60	
49	B0	91	
50	B4	73	
51	B5	60	
52	B6	82	
53	B7	47	
54	B8	64	

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Mol	Chain	Length	Quality of chain
55	B9	36	
56	BK	141	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	YYG	AW	37	X	-	X	X
3	PSU	AW	39	-	-	-	X

2 Entry composition [i](#)

There are 56 unique types of molecules in this entry. The entry contains 142811 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 ribosomal RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	AA	1515	32551	14490	6022	10525	1514	0	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AA	416	G	-	insertion	GB 155076
AA	905	U	-	insertion	GB 155076
AA	1395	C	-	insertion	GB 155076

- Molecule 2 is a RNA chain called P-site tRNA (Phe).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	AV	76	1622	725	293	529	75	0	0	0

- Molecule 3 is a RNA chain called E-site tRNA (Phe).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
3	AW	76	1638	736	294	533	75	0	0	0

- Molecule 4 is a RNA chain called 5'-D(*AP*UP*GP*UP*UP*CP*UP*AP*GP*AP*UP*A P*CP*AP*AP*UP*AP*AP*U)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
4	AX	17	136	56	19	44	17	0	0	11

- Molecule 5 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	AB	234	1900	1213	341	341	5	0	0	0

- Molecule 6 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
6	AC	206	1612	1016	314	281	1	0	0	0

- Molecule 7 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
7	AD	208	1703	1066	339	291	7	0	0	0

- Molecule 8 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
8	AE	150	1146	724	217	201	4	0	0	0

- Molecule 9 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
9	AF	101	843	531	155	154	3	0	0	0

- Molecule 10 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
10	AG	155	1257	781	252	218	6	0	0	0

- Molecule 11 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
11	AH	138	1116	705	215	193	3	0	0	0

- Molecule 12 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
12	AI	127	1011	639	198	174	0	0	0

- Molecule 13 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
13	AJ	98	794	499	156	138	1	0	0	0

- Molecule 14 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
14	AK	119	885	549	168	165	3	0	0	0

- Molecule 15 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
15	AL	124	970	611	195	163	1	0	0	0

- Molecule 16 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
16	AM	125	997	617	207	171	2	0	0	0

- Molecule 17 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
17	AN	60	492	312	104	72	4	0	0	0

- Molecule 18 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
18	AO	88	734	459	147	126	2	0	0	0

- Molecule 19 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
19	AP	83	700	443	139	117	1	0	0	0

- Molecule 20 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
20	AQ	104	857	547	161	147	2	0	0	0

- Molecule 21 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
21	AR	73	597	380	118	99	0	0	0

- Molecule 22 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
22	AS	80	647	414	119	112	2	0	0	0

- Molecule 23 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
23	AT	99	762	469	162	129	2	0	0	0

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

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
24	AU	24	208	128	50	30	0	0	0

- Molecule 25 is a protein called Peptide chain release factor 2.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
25	AY	365	Total 365 C 365	0	0	365

- Molecule 26 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
26	BB	123	2637	1175	488	852	122	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BB	-1	A	-	insertion	GB 48271

- Molecule 27 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
27	BA	2814	60599	26974	11331	19482	2812	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
BA	493	G	-	insertion	GB 48268

- Molecule 28 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
28	BD	173	1308	820	246	236	6	0	0	0

- Molecule 29 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
29	BE	191	1507	940	290	273	4	0	0	0

- Molecule 30 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
30	BF	189	1430	872	255	302	1	0	0	0

- Molecule 31 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
31	BG	122	957	597	176	180	4	0	0	0

- Molecule 32 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
32	BH	164	1251	787	225	237	2	0	0	0

- Molecule 33 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
33	BI	148	1145	727	205	212	1	0	0	0

- Molecule 34 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
34	BN	117	917	570	164	180	3	0	0	0

- Molecule 35 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
35	BO	122	937	585	180	169	3	0	0	0

- Molecule 36 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
36	BP	84	639	391	109	139	0	0	0

- Molecule 37 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
37	BQ	138	1081	678	208	192	3	0	0	0

- Molecule 38 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
38	BS	113	866	536	165	164	1	0	0	0

- Molecule 39 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
39	BT	52	406	242	74	85	5	0	0	0

- Molecule 40 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
40	BW	108	860	542	169	149		0	0	0

- Molecule 41 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
41	BX	76	602	366	102	131	3	0	0	0

- Molecule 42 is a protein called 50S ribosomal protein 24.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
42	BY	110	879	531	166	182		0	0	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
43	BZ	177	1360	859	238	257	6	0	0	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
44	BR	105	855	536	174	145		0	0	0

- Molecule 45 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
45	BU	117	978	608	210	159	1	0	0	0

- Molecule 46 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
46	BV	100	787	495	146	145	1	0	0	0

- Molecule 47 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
47	B2	64	494	301	93	99	1	0	0	0

- Molecule 48 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
48	B3	60	477	303	91	82	1	0	0	0

- Molecule 49 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
49	B0	86	641	402	124	114	1	0	0	0

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
50	B4	73	604	382	110	108	4	0	0	0

- Molecule 51 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
51	B5	58	457	281	94	77	5	0	0	0

- Molecule 52 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
52	B6	53	431	274	80	76	1	0	0	0

- Molecule 53 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
53	B7	46	Total	C	N	O	S	0	0	0
			383	230	91	60	2			

- Molecule 54 is a protein called 50S ribosomal protein L35.

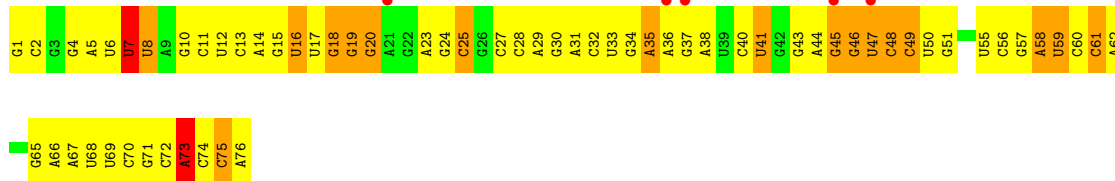
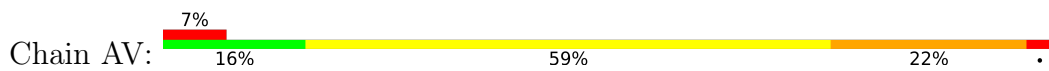
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
54	B8	63	Total	C	N	O	S	0	0	0
			496	312	101	78	5			

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

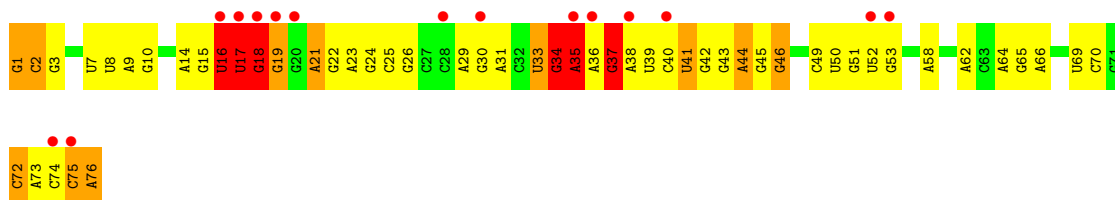
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
55	B9	35	Total	C	N	O	S	0	0	0
			285	172	64	45	4			

- Molecule 56 is a protein called 50S ribosomal protein L11.

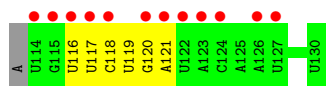
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
56	BK	133	Total	C	N	O	S	0	0	0
			999	642	169	182	6			



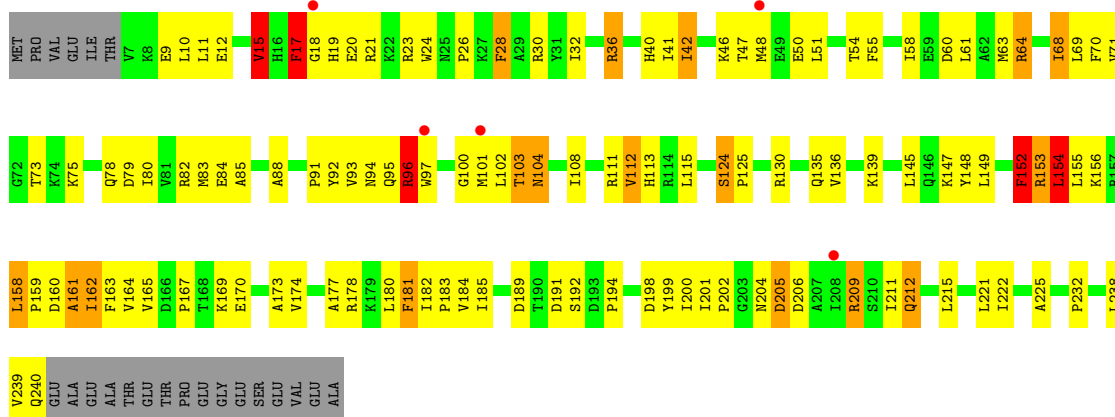
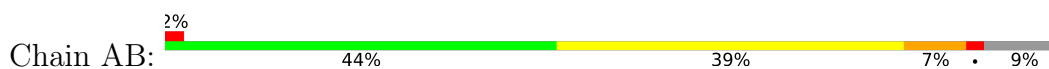
• Molecule 3: E-site tRNA (Phe)



• Molecule 4: 5'-D(*AP*UP*GP*UP*UP*CP*UP*AP*GP*AP*UP*AP*CP*AP*AP*UP*AP*A P*U)-3'



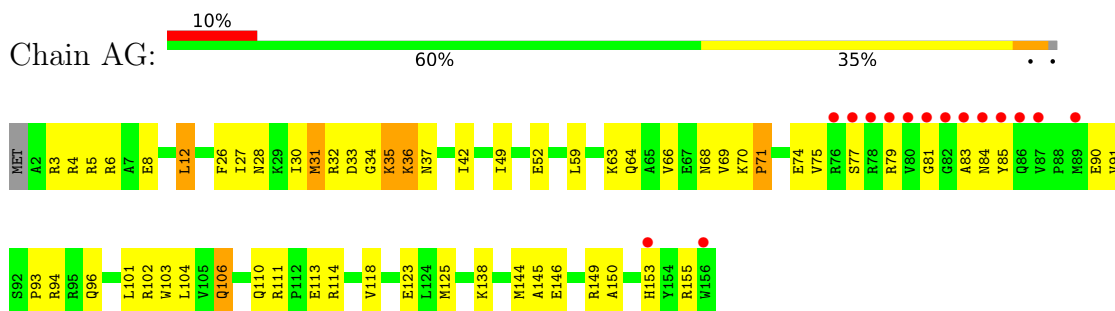
• Molecule 5: 30S ribosomal protein S2



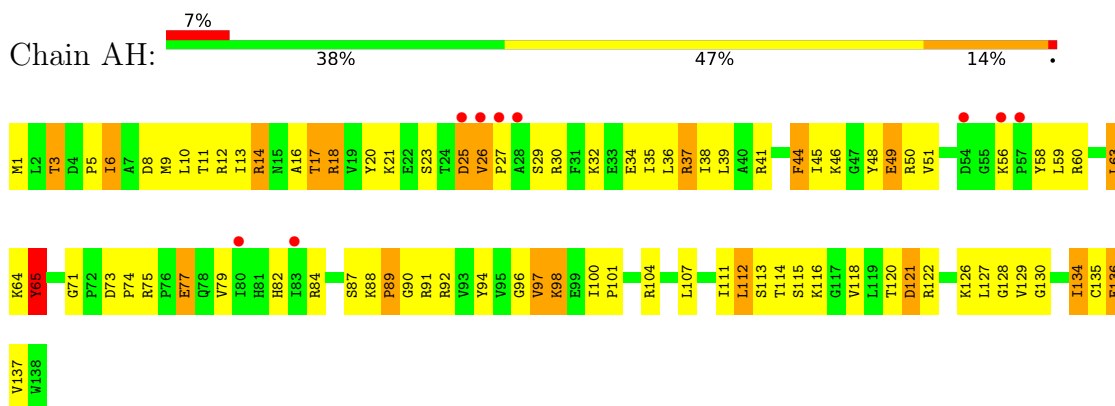
• Molecule 6: 30S ribosomal protein S3



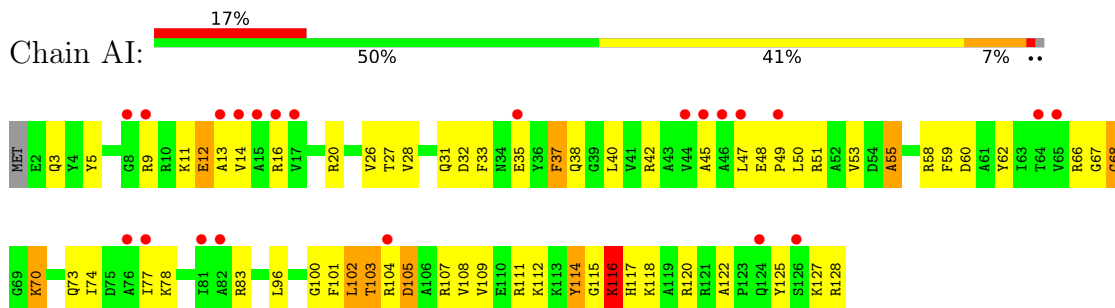
- Molecule 10: 30S ribosomal protein S7



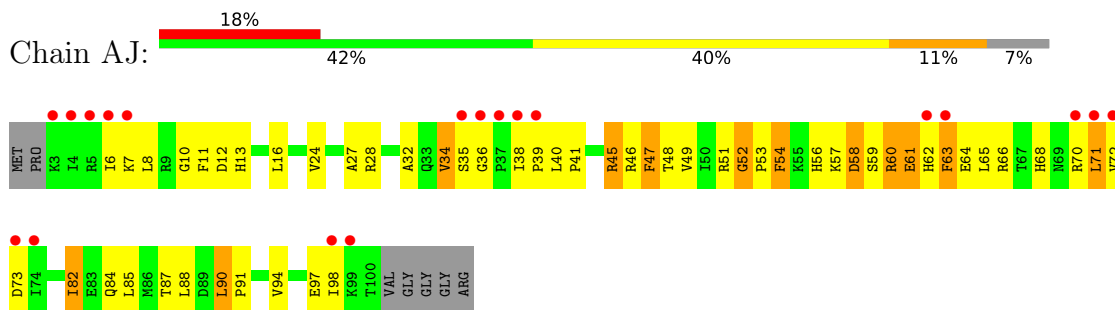
- Molecule 11: 30S ribosomal protein S8



- Molecule 12: 30S ribosomal protein S9

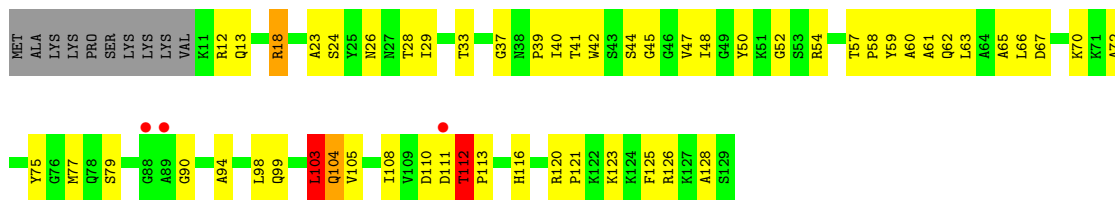


- Molecule 13: 30S ribosomal protein S10

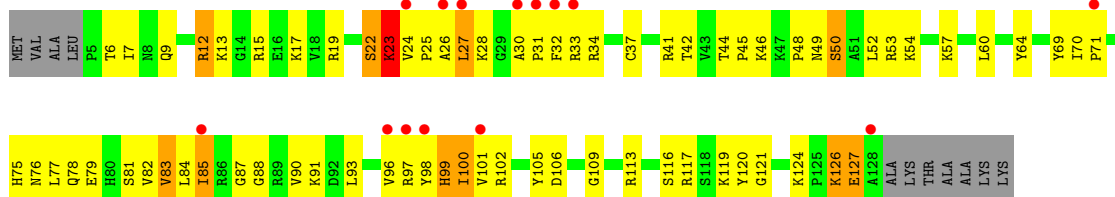
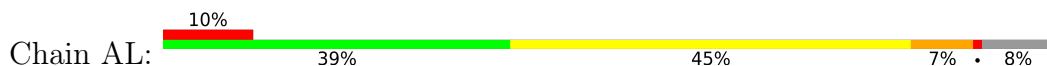


- Molecule 14: 30S ribosomal protein S11

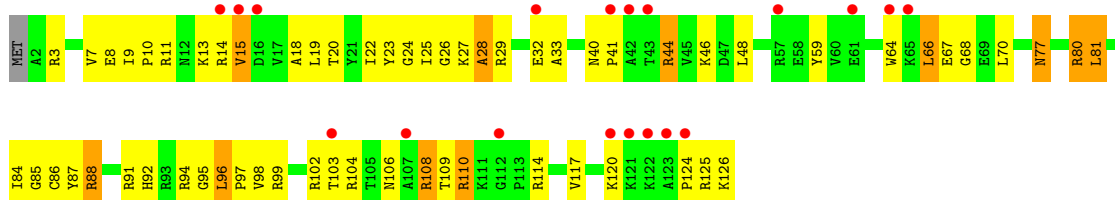




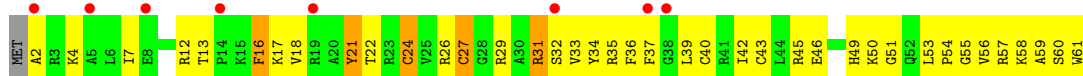
- Molecule 15: 30S ribosomal protein S12



- Molecule 16: 30S ribosomal protein S13



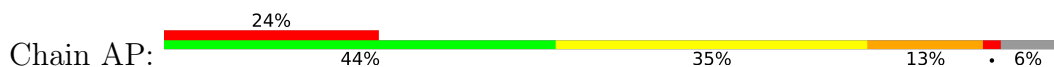
- Molecule 17: 30S ribosomal protein S14



- Molecule 18: 30S ribosomal protein S15

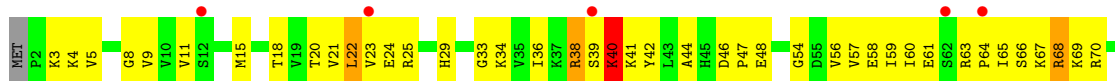


- Molecule 19: 30S ribosomal protein S16

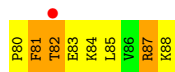
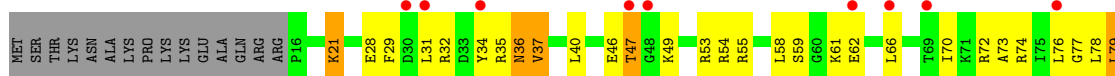




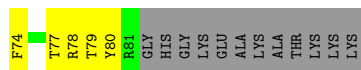
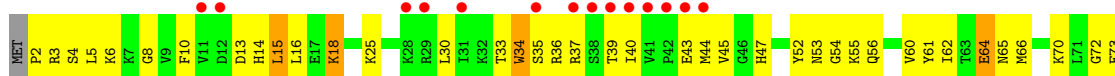
- Molecule 20: 30S ribosomal protein S17



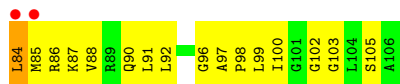
- Molecule 21: 30S ribosomal protein S18



- Molecule 22: 30S ribosomal protein S19

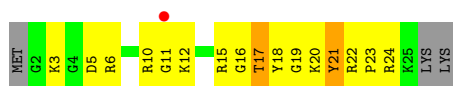


- Molecule 23: 30S ribosomal protein S20

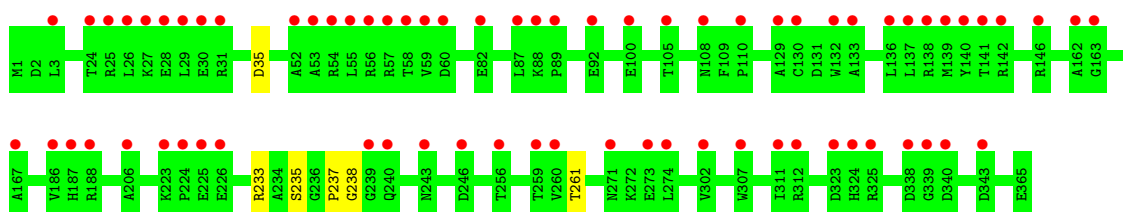


- Molecule 24: 30S ribosomal protein Thx

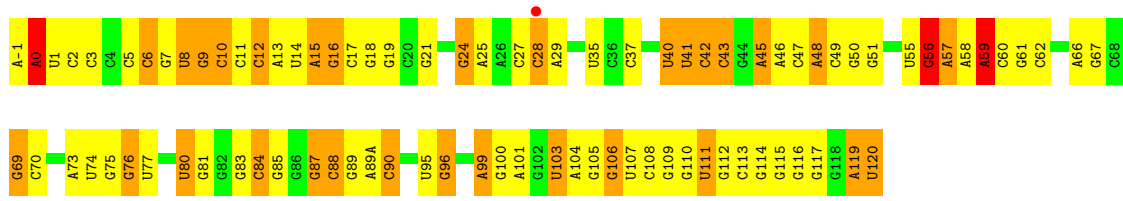




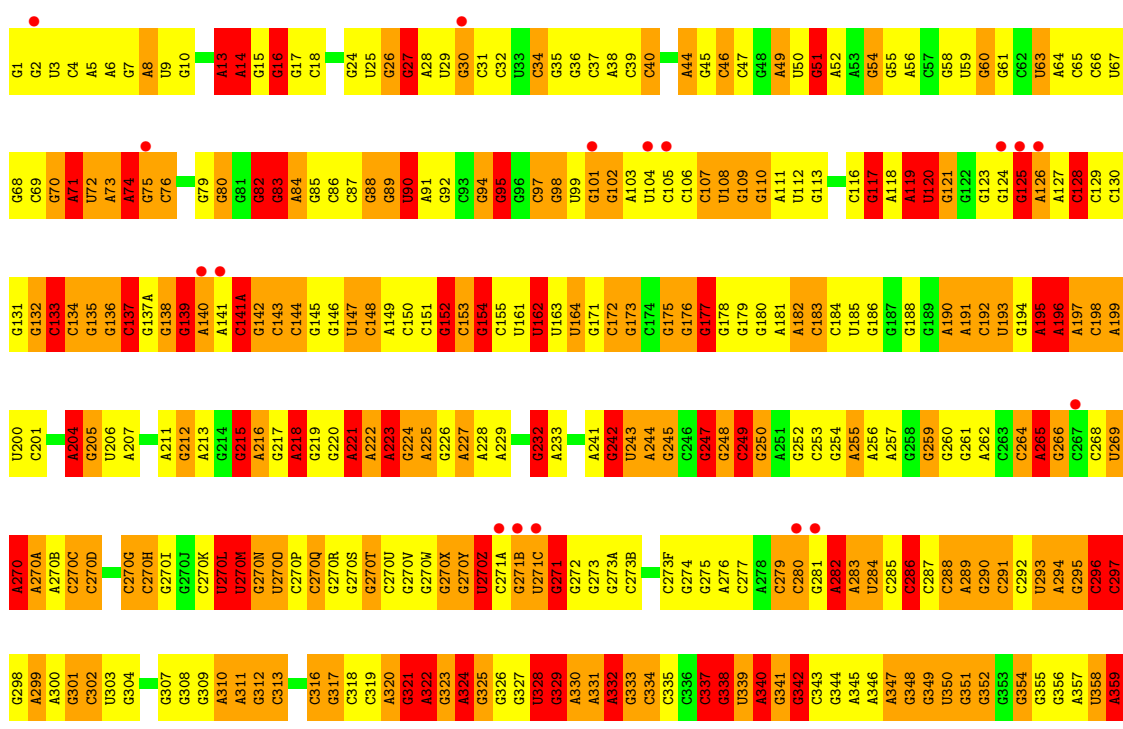
• Molecule 25: Peptide chain release factor 2

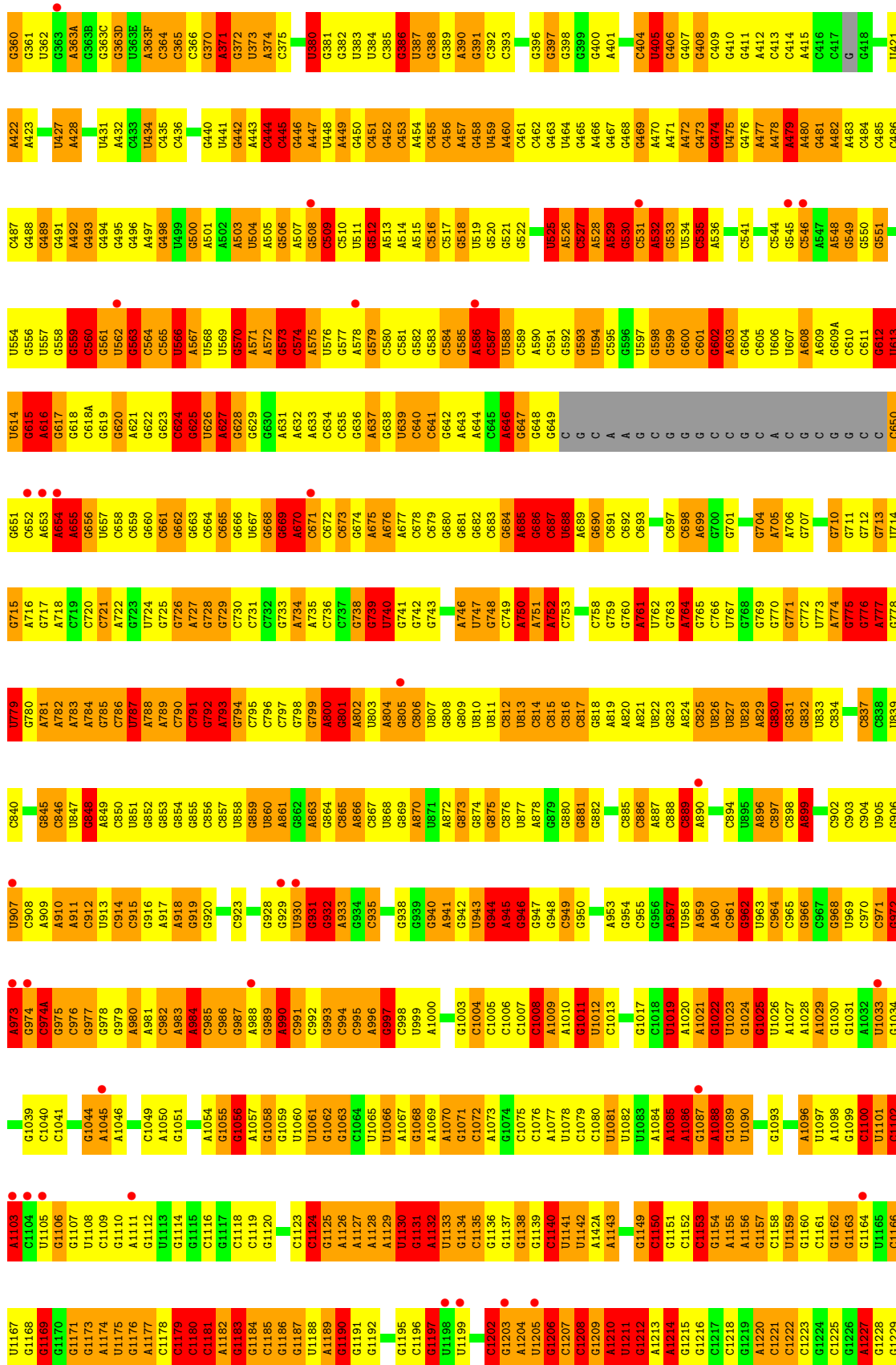


• Molecule 26: 5S ribosomal RNA



• Molecule 27: 23S ribosomal RNA



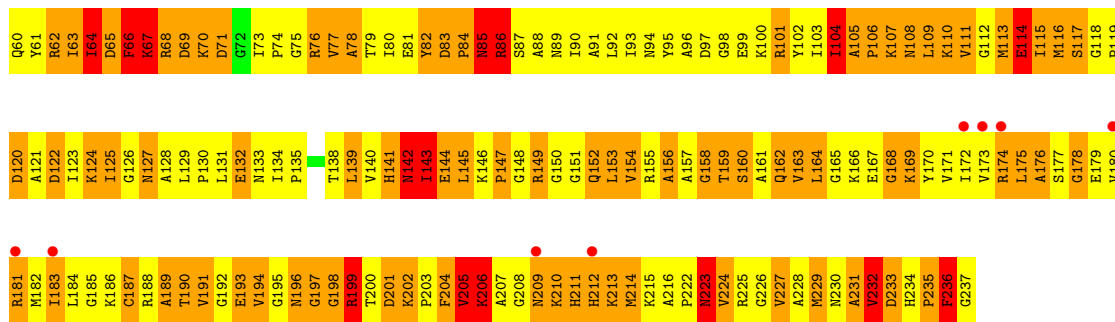


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C2026	U1963	C1767	C1686	G1627	C1557	A1494	G1425	C1363	U1300	U1235
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C1974	C1838	U1778	A1698	A1637	A1572	A1508	C1437	A1373	G1310	G1245
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A1936	G1862	C1800	A1732	U1659	C1599	A1529	U1462	C1333	U1267	U1267
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C2006	C1879	A1806	G1743	G1665	G1605	U1535	A1471	C1402	U1273	U1273
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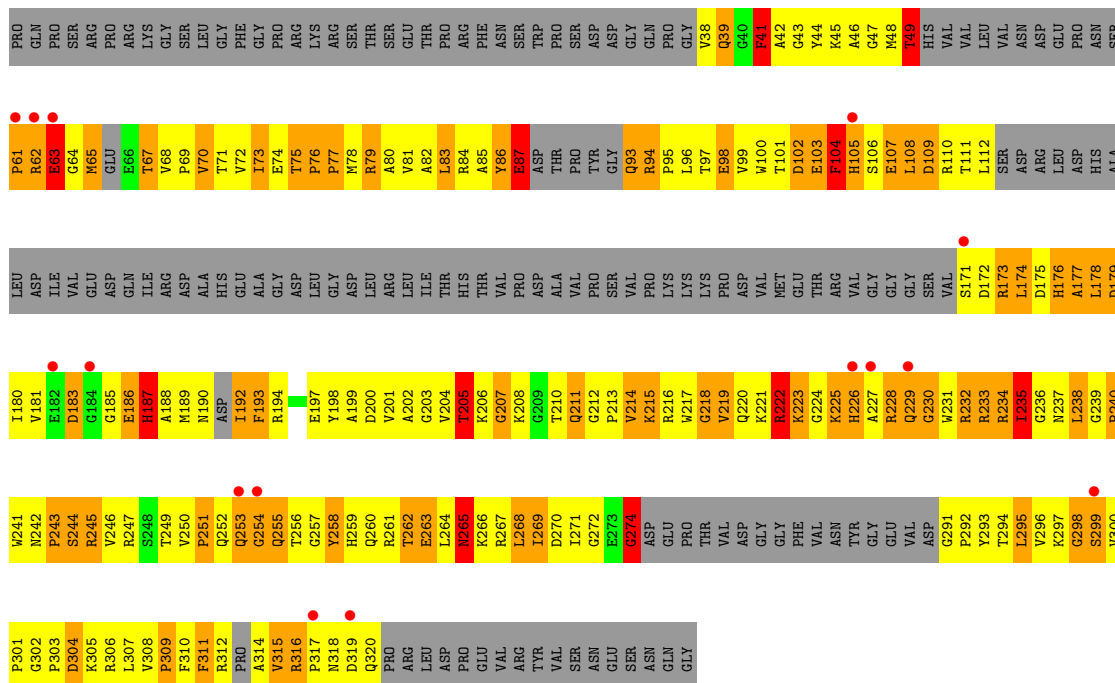
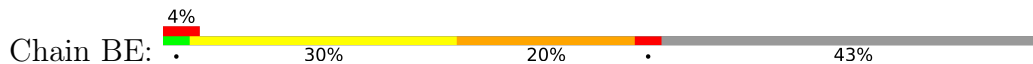
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G2194	C2264	C2324	G2384	G2444	U2504	A2564	G2624	U2684	C2743	G2805	U2866	
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C2207	U2272	U2332	A2392	A2452	C2512	A2572	A2632	C2692	A2751	C2814	C2874	
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● Molecule 28: 50S ribosomal protein L2

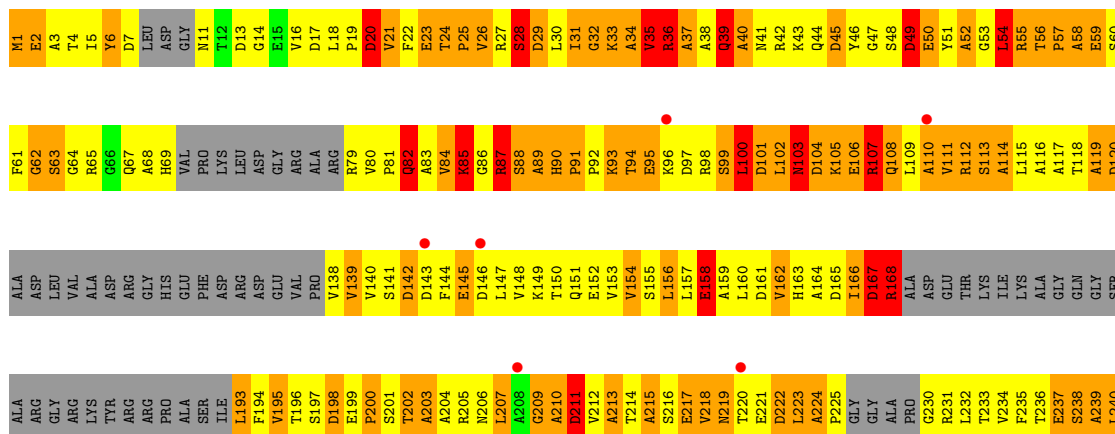




• Molecule 29: 50S ribosomal protein L3



• Molecule 30: 50S ribosomal protein L4



A241
E242
V243
A244
E245
R246

• Molecule 31: 50S ribosomal protein L5



SER SER GLU SER GLU SER GLY ASP
F10 H11 H12 M13 M14 M15
P16 R17 R18 E19 K20 V21 V22 V23 V24 H24 M25 G26
I27 G28 H29 K30 K31 K32 K33 K34 K35 K36 K37 K38 K39 K40 K41 K42 K43 K44 K45 K46 K47 K48 K49 K50 K51 K52 K53 K54 K55 K56 K57 K58 K59 E60

F61 D62 R63 R64 E65 G66 D67 P68 P69 G70 A71 K72 W73 W74 W75 W76 D77 E78 M79 A80 A81 E82 E83 F83 L84 R85 T86 A87 L88 L89 P89 R90 L90 L91 A92 E92 E93 A94 A95 T95 S96 Q97 F98 D99 D100 T101 G102 G103 F104 F105 F106 G107 VAL GLU GLU HIS THR VAL PHE PRO SER GLN TYR ASP

PRO SER ILE GLY TVR GLY L128 D129 V130 T131 M132 M133 L134 V135 R136 P137 G138 M139 R140 V141 A142 K143 F83 L84 D145 K146 A147 S148 R149 S150 A151 P152 T153 K154 H155 R156 ASN PRO ALA ASP VAL VAL ALA PHE ILE THR TVR ASP VAL THR VAL PHE GLU

• Molecule 32: 50S ribosomal protein L6



SER ARG VAL GLY LYS P7 I8 E9 I10 P11 A12 G13 V14 V15 V16 V17 V18 M19 G20 G21 T22 E23 V23 T24 V25 K26 G27 P28 G29 G30 G31 L32 T33 R34 T35 F36 R37 P38 D39 M40 T41 T42 T43 V44 E45 G46 V48 V49 T50 M51 T52 R53 P54 S55 S56 E57 K58 H59 H60

R61 A62 H63 H64 G65 T66 T67 R68 S69 L70 L71 A72 M73 M74 V75 E76 G77 V78 S79 R80 G81 Y82 E83 K84 A85 L86 E87 L88 V89 G90 V91 G92 Y93 R94 A95 P96 K97 Q98 G99 K100 K101 L102 V103 L104 S105 G106 Y108 S109 H110 P111 V112 I113 I114 S115 P116 E117 E118 G119 L120

E121 I122 E123 V124 P125 S126 Q127 T128 S129 I130 I131 A132 V132 K133 G134 A135 K137 Q138 R139 V140 G141 E142 L143 A144 A145 M146 I147 R148 A149 V150 R151 P152 P153 E154 P155 Y156 G158 K159 G160 I161 R162 Y163 E164 G165 E166 L167 V168 R169 L170 LYS GLU GLY THR GLY LYS

• Molecule 33: 50S ribosomal protein L9



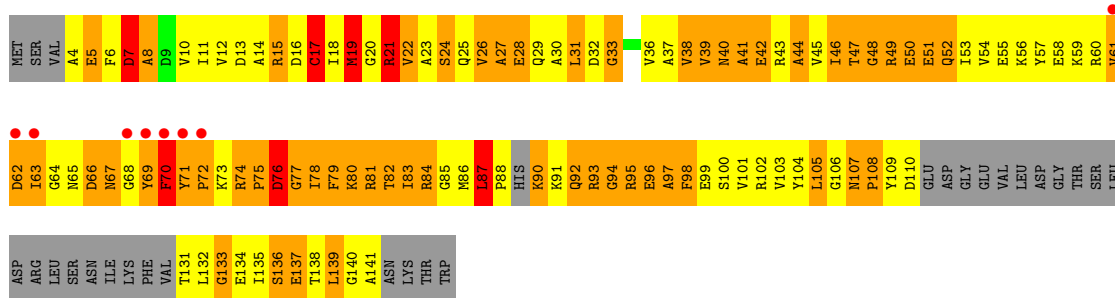
M1 K2 V3 I4 F5 L6 K7 D8 V9 K10 G11 G12 K12 G13 K14 G15 G16 I17 I18 K19 N20 V21 A22 D23 G24 Y25 A26 N27 N28 F29 G30 S31 K32 Q33 G34 L35 A36 I37 E38 A39 T40 P41 A42 M43 L44 K45 A46 L47 A48 E49 Q50 K51 Q52 K53 E54 L55 Q55 R56 Q57 A58 A59 E60

B61 L62 A63 N64 A65 K66 K67 L68 K69 E70 K71 L72 L73 L74 L75 T76 V77 T78 I79 P80 A81 A82 A83 G84 E85 G86 GLY R88 L89 F90 S91 S92 I93 T94 S95 K96 Q97 I98 A99 E100 S101 Q103 A104 L105 H106 L107 L108 K109 D110 D111 K112 R113 K114 I115 E116 L117 A118 D119 A120 I121

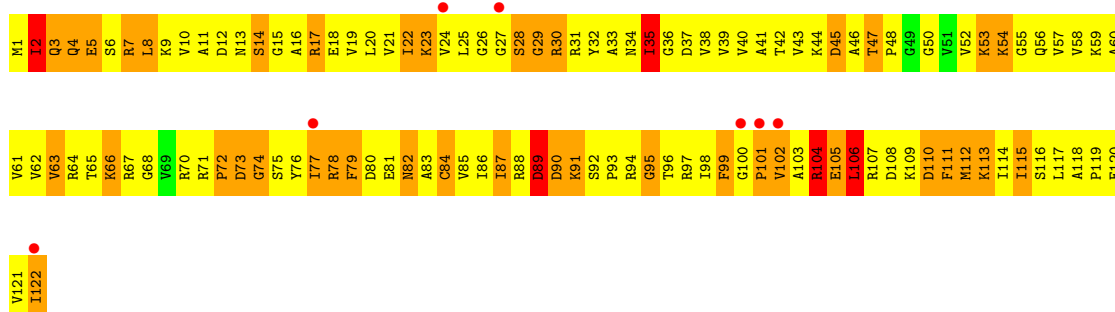
R122 A123 L124 G125 H128 V129 P130 V131 K132 L133 H134 P135 E136 V137 T138 A139 T140 L141 K142 V143 V144 V145 T146 E147 G148 K149

• Molecule 34: 50S ribosomal protein L13

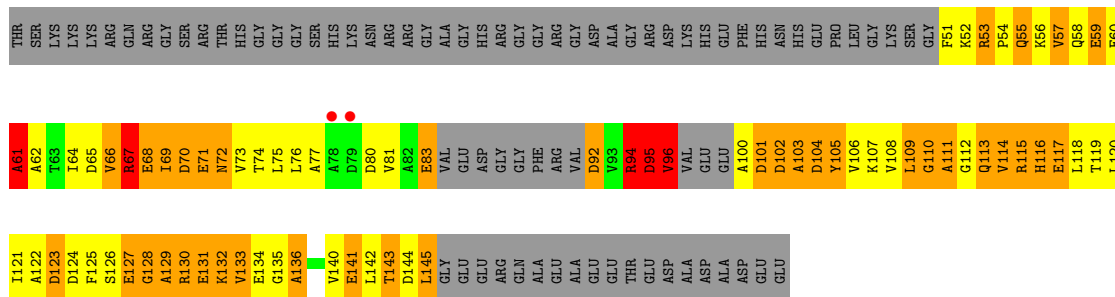
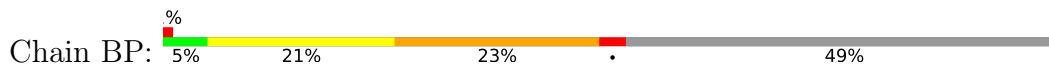




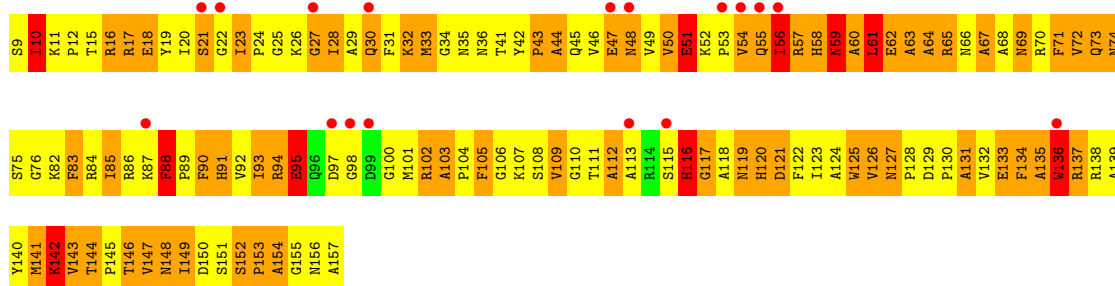
• Molecule 35: 50S ribosomal protein L14



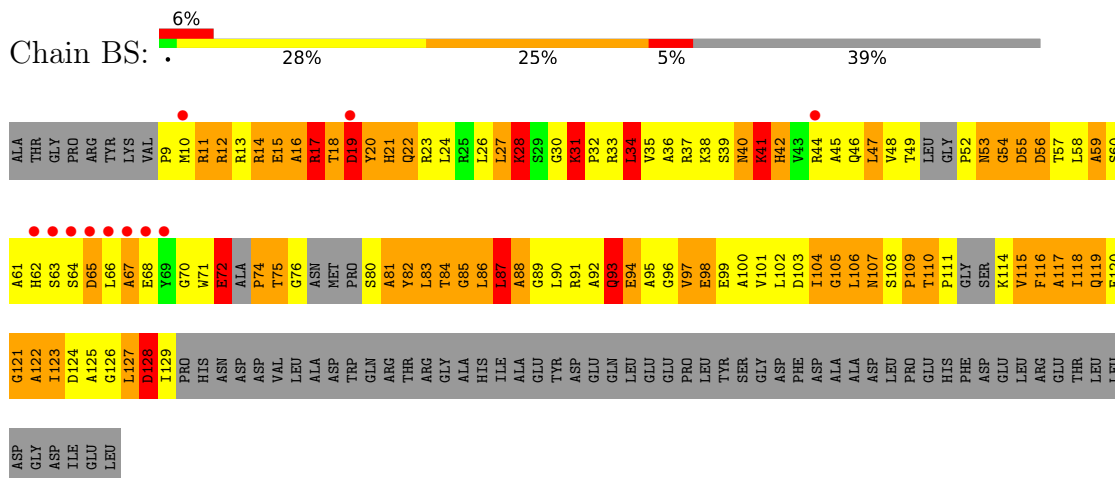
• Molecule 36: 50S ribosomal protein L15



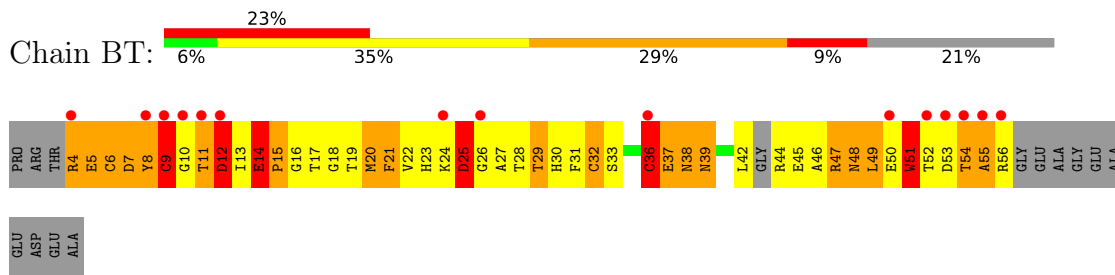
• Molecule 37: 50S ribosomal protein L16



• Molecule 38: 50S ribosomal protein L18



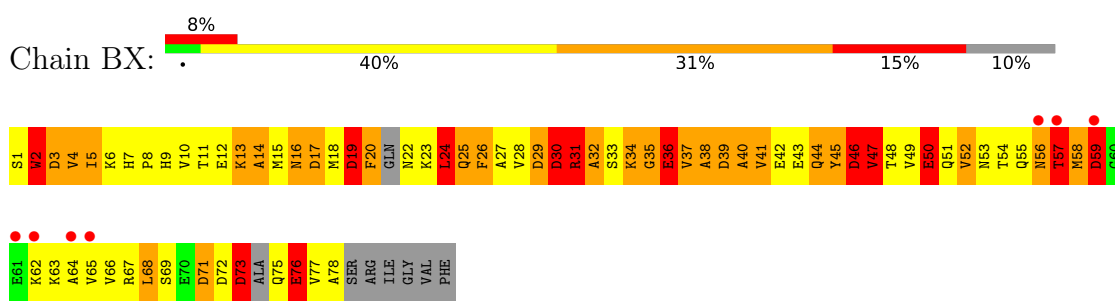
• Molecule 39: 50S ribosomal protein L19



• Molecule 40: 50S ribosomal protein L22

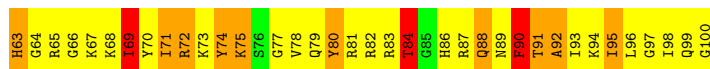


• Molecule 41: 50S ribosomal protein L23



• Molecule 42: 50S ribosomal protein 24





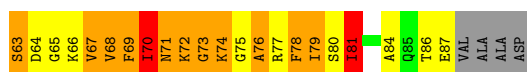
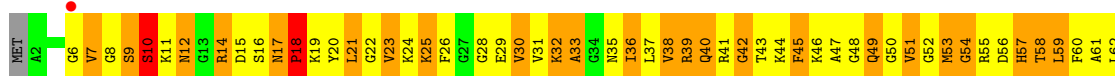
- Molecule 47: 50S ribosomal protein L29



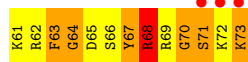
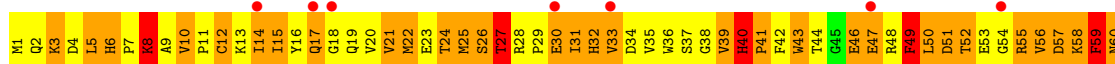
- Molecule 48: 50S ribosomal protein L30



- Molecule 49: 50S ribosomal protein L27



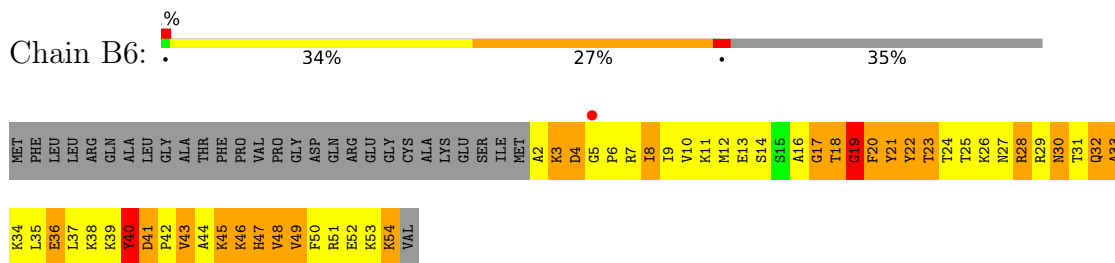
- Molecule 50: 50S ribosomal protein L31



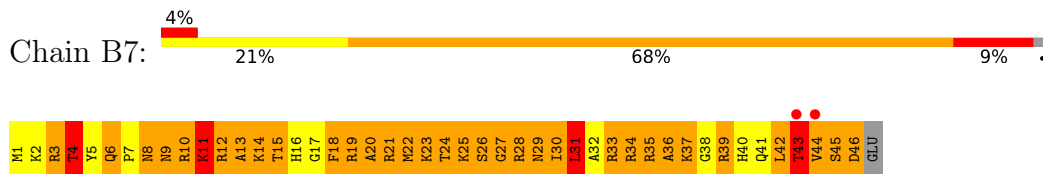
- Molecule 51: 50S ribosomal protein L32



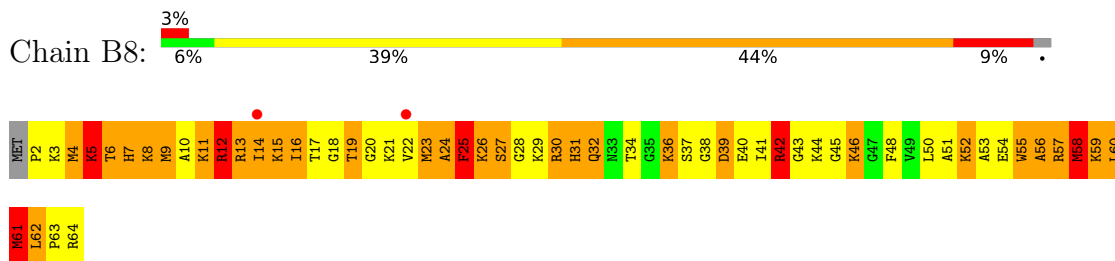
- Molecule 52: 50S ribosomal protein L33



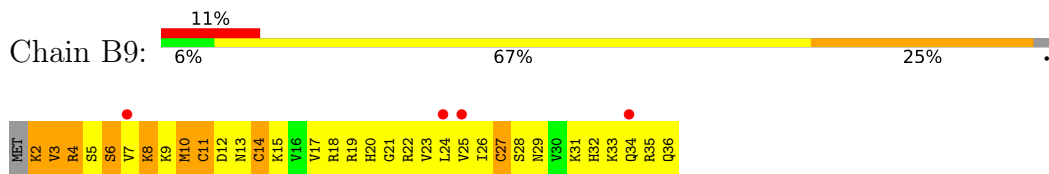
- Molecule 53: 50S ribosomal protein L34



- Molecule 54: 50S ribosomal protein L35



- Molecule 55: 50S ribosomal protein L36



- Molecule 56: 50S ribosomal protein L11



4 Data and refinement statistics i

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	520.21Å 520.21Å 365.90Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	43.35 – 6.76 43.35 – 6.02	Depositor EDS
% Data completeness (in resolution range)	96.2 (43.35-6.76) 91.3 (43.35-6.02)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.19	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.11 (at 6.14Å)	Xtrriage
Refinement program	CNS	Depositor
R, R_{free}	0.341 , 0.356 0.328 , 0.341	Depositor DCC
R_{free} test set	5643 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	233.6	Xtrriage
Anisotropy	0.105	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.09 , 97.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.37$, $\langle L^2 \rangle = 0.20$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.87	EDS
Total number of atoms	142811	wwPDB-VP
Average B, all atoms (Å ²)	306.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.50% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: PSU, YYG

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	AA	1.34	66/36411 (0.2%)	1.47	428/56769 (0.8%)
2	AV	1.58	5/1814 (0.3%)	1.08	11/2827 (0.4%)
3	AW	1.77	16/1737 (0.9%)	1.68	30/2690 (1.1%)
4	AX	0.18	0/139	0.66	0/213
5	AB	0.61	2/1935 (0.1%)	0.61	0/2609
6	AC	0.43	1/1636 (0.1%)	1.10	6/2205 (0.3%)
7	AD	0.79	5/1733 (0.3%)	1.09	11/2318 (0.5%)
8	AE	0.92	1/1162 (0.1%)	0.63	2/1564 (0.1%)
9	AF	0.35	0/856	0.54	0/1154
10	AG	0.33	0/1276	0.76	3/1709 (0.2%)
11	AH	0.41	0/1136	0.66	0/1527
12	AI	0.34	0/1029	0.54	0/1378
13	AJ	0.35	0/807	0.56	0/1085
14	AK	0.64	1/900 (0.1%)	0.56	0/1213
15	AL	0.99	1/986 (0.1%)	0.70	1/1320 (0.1%)
16	AM	0.35	0/1006	0.56	0/1341
17	AN	0.49	0/501	0.64	1/664 (0.2%)
18	AO	0.32	0/745	0.54	0/992
19	AP	0.40	0/716	0.59	1/963 (0.1%)
20	AQ	1.20	3/870 (0.3%)	1.54	6/1159 (0.5%)
21	AR	0.40	0/603	0.70	0/799
22	AS	0.34	0/661	0.53	0/890
23	AT	0.31	0/764	0.57	1/1006 (0.1%)
24	AU	0.34	0/212	0.49	0/277
26	BB	0.79	2/2950 (0.1%)	1.32	17/4602 (0.4%)
27	BA	1.31	147/67834 (0.2%)	1.47	923/105806 (0.9%)
28	BD	0.41	1/1328 (0.1%)	0.65	2/1783 (0.1%)
29	BE	0.67	4/1540 (0.3%)	1.08	8/2078 (0.4%)
30	BF	0.72	3/1444 (0.2%)	0.84	2/1954 (0.1%)
31	BG	0.25	0/971	0.46	0/1304
32	BH	0.45	1/1272 (0.1%)	0.60	3/1721 (0.2%)
33	BI	0.40	1/1156 (0.1%)	0.52	0/1544

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
34	BN	0.35	0/927	0.55	0/1245
35	BO	0.32	0/946	0.57	0/1269
36	BP	1.44	3/643 (0.5%)	1.31	5/870 (0.6%)
37	BQ	0.32	0/1106	0.52	0/1490
38	BS	1.20	3/877 (0.3%)	0.70	2/1179 (0.2%)
39	BT	0.39	0/412	0.70	0/554
40	BW	0.95	3/869 (0.3%)	0.96	6/1166 (0.5%)
41	BX	0.48	1/608 (0.2%)	1.04	3/820 (0.4%)
42	BY	0.25	0/887	0.83	3/1195 (0.3%)
43	BZ	0.31	1/1385 (0.1%)	0.46	0/1883
44	BR	0.30	0/867	0.49	0/1162
45	BU	0.56	1/994 (0.1%)	0.69	3/1323 (0.2%)
46	BV	0.69	1/796 (0.1%)	0.92	3/1058 (0.3%)
47	B2	0.37	0/497	1.00	2/668 (0.3%)
48	B3	0.31	0/482	0.50	0/646
49	B0	0.40	1/649 (0.2%)	0.82	3/860 (0.3%)
50	B4	1.31	2/620 (0.3%)	0.61	0/831
51	B5	0.38	0/469	1.08	3/629 (0.5%)
52	B6	0.32	0/438	0.55	1/583 (0.2%)
53	B7	0.38	0/387	0.64	0/509
54	B8	0.87	1/503 (0.2%)	0.95	6/657 (0.9%)
55	B9	0.33	0/286	0.59	0/375
56	BK	0.94	1/1010 (0.1%)	0.70	3/1349 (0.2%)
All	All	1.16	278/154788 (0.2%)	1.32	1499/231785 (0.6%)

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	AW	1	5
6	AC	0	1
14	AK	0	1
20	AQ	0	1
28	BD	0	1
29	BE	0	3
30	BF	0	4
32	BH	0	1
33	BI	0	1
36	BP	0	1
41	BX	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
42	BY	0	1
47	B2	0	1
49	B0	0	1
51	B5	0	1
All	All	1	24

The worst 5 of 278 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	AA	1037	C	O3'-P	-82.19	0.62	1.61
1	AA	1255	G	O3'-P	-72.80	0.73	1.61
27	BA	2199	A	O3'-P	-71.10	0.75	1.61
27	BA	14	A	O3'-P	-50.73	1.00	1.61
27	BA	1924	C	O3'-P	-48.85	1.02	1.61

The worst 5 of 1499 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
27	BA	712(A)	A	P-O3'-C3'	-43.34	67.69	119.70
27	BA	2199	A	O3'-P-O5'	-43.06	22.18	104.00
27	BA	2454	G	P-O3'-C3'	-28.75	85.20	119.70
29	BE	49	THR	O-C-N	-27.49	68.88	121.10
3	AW	33	U	P-O3'-C3'	27.30	152.45	119.70

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	AW	37	YYG	C15

5 of 24 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	AW	16	U	Sidechain
3	AW	17	U	Sidechain
3	AW	18	G	Sidechain
3	AW	19	G	Sidechain
3	AW	62	A	Sidechain

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	AA	32551	0	16464	2038	4
2	AV	1622	0	819	182	0
3	AW	1638	0	835	193	0
4	AX	136	0	63	22	0
5	AB	1900	0	1950	92	0
6	AC	1612	0	1675	113	0
7	AD	1703	0	1760	288	0
8	AE	1146	0	1206	59	0
9	AF	843	0	857	49	0
10	AG	1257	0	1295	94	0
11	AH	1116	0	1177	99	0
12	AI	1011	0	1040	89	0
13	AJ	794	0	840	105	0
14	AK	885	0	904	55	0
15	AL	970	0	1056	74	0
16	AM	997	0	1070	186	0
17	AN	492	0	529	95	0
18	AO	734	0	771	30	0
19	AP	700	0	720	78	0
20	AQ	857	0	928	53	0
21	AR	597	0	668	52	0
22	AS	647	0	672	215	0
23	AT	762	0	859	33	0
24	AU	208	0	221	75	0
25	AY	365	0	0	14	0
26	BB	2637	0	1338	187	1
27	BA	60599	0	30523	10794	127
28	BD	1308	0	1346	1071	0
29	BE	1507	0	1475	1137	4
30	BF	1430	0	1357	1068	0
31	BG	957	0	950	687	0
32	BH	1251	0	1291	749	0
33	BI	1145	0	1224	627	4
34	BN	917	0	896	761	0
35	BO	937	0	992	621	0
36	BP	639	0	606	487	0
37	BQ	1081	0	1047	934	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
38	BS	866	0	868	691	0
39	BT	406	0	359	164	0
40	BW	860	0	909	568	0
41	BX	602	0	559	448	0
42	BY	879	0	859	751	0
43	BZ	1360	0	1377	897	0
44	BR	855	0	904	561	0
45	BU	978	0	1001	880	0
46	BV	787	0	784	643	0
47	B2	494	0	504	396	0
48	B3	477	0	528	441	0
49	B0	641	0	658	517	0
50	B4	604	0	586	493	0
51	B5	457	0	455	288	0
52	B6	431	0	454	288	0
53	B7	383	0	411	393	0
54	B8	496	0	539	359	0
55	B9	285	0	312	150	0
56	BK	999	0	1065	119	0
All	All	142811	0	94556	28242	136

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 120.

The worst 5 of 28242 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
51:B5:33:CYS:SG	51:B5:36:CYS:HB2	1.24	1.69
27:BA:2470:G:C2	27:BA:2471:C:C5	1.81	1.69
27:BA:2712:U:C6	27:BA:712(A):A:C8	1.76	1.68
53:B7:30:ILE:HA	53:B7:33:ARG:CD	1.21	1.67
27:BA:2580:U:C6	27:BA:2581:G:C8	1.82	1.66

The worst 5 of 136 symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
27:BA:6:A:O4'	27:BA:2902:C:C1'[8_554]	0.64	1.56
27:BA:6:A:C4'	27:BA:2902:C:O2'[8_554]	0.74	1.46
27:BA:6:A:C4'	27:BA:2902:C:C2'[8_554]	0.77	1.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
27:BA:5:A:N7	27:BA:2901:C:N1[8_554]	0.83	1.37
27:BA:6:A:O4'	27:BA:2902:C:C2'[8_554]	0.90	1.30

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 X-ray entries followed by that with respect to entries of similar resolution.

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	
5	AB	232/256 (91%)	183 (79%)	34 (15%)	15 (6%)	1	16
6	AC	204/239 (85%)	165 (81%)	23 (11%)	16 (8%)	1	13
7	AD	206/209 (99%)	156 (76%)	33 (16%)	17 (8%)	1	12
8	AE	148/162 (91%)	115 (78%)	29 (20%)	4 (3%)	5	31
9	AF	99/101 (98%)	85 (86%)	10 (10%)	4 (4%)	3	23
10	AG	153/156 (98%)	131 (86%)	18 (12%)	4 (3%)	5	31
11	AH	136/138 (99%)	101 (74%)	25 (18%)	10 (7%)	1	14
12	AI	125/128 (98%)	87 (70%)	30 (24%)	8 (6%)	1	16
13	AJ	96/105 (91%)	73 (76%)	14 (15%)	9 (9%)	0	10
14	AK	117/129 (91%)	88 (75%)	22 (19%)	7 (6%)	1	17
15	AL	122/135 (90%)	92 (75%)	13 (11%)	17 (14%)	0	4
16	AM	119/126 (94%)	95 (80%)	19 (16%)	5 (4%)	3	22
17	AN	58/61 (95%)	42 (72%)	12 (21%)	4 (7%)	1	15
18	AO	86/89 (97%)	76 (88%)	9 (10%)	1 (1%)	13	50
19	AP	81/88 (92%)	64 (79%)	10 (12%)	7 (9%)	1	12
20	AQ	102/105 (97%)	78 (76%)	18 (18%)	6 (6%)	1	17
21	AR	71/88 (81%)	54 (76%)	11 (16%)	6 (8%)	1	12
22	AS	78/93 (84%)	60 (77%)	15 (19%)	3 (4%)	3	24
23	AT	97/106 (92%)	79 (81%)	12 (12%)	6 (6%)	1	17

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
24	AU	22/27 (82%)	17 (77%)	3 (14%)	2 (9%)	1	11
28	BD	169/173 (98%)	60 (36%)	34 (20%)	75 (44%)	0	0
29	BE	183/338 (54%)	90 (49%)	34 (19%)	59 (32%)	0	0
30	BF	179/246 (73%)	51 (28%)	47 (26%)	81 (45%)	0	0
31	BG	116/176 (66%)	46 (40%)	31 (27%)	39 (34%)	0	0
32	BH	162/177 (92%)	74 (46%)	39 (24%)	49 (30%)	0	0
33	BI	144/149 (97%)	71 (49%)	29 (20%)	44 (31%)	0	0
34	BN	111/145 (77%)	34 (31%)	20 (18%)	57 (51%)	0	0
35	BO	120/122 (98%)	61 (51%)	27 (22%)	32 (27%)	0	0
36	BP	82/164 (50%)	29 (35%)	19 (23%)	34 (42%)	0	0
37	BQ	130/138 (94%)	38 (29%)	35 (27%)	57 (44%)	0	0
38	BS	105/186 (56%)	36 (34%)	20 (19%)	49 (47%)	0	0
39	BT	48/66 (73%)	17 (35%)	13 (27%)	18 (38%)	0	0
40	BW	104/113 (92%)	41 (39%)	16 (15%)	47 (45%)	0	0
41	BX	72/84 (86%)	26 (36%)	18 (25%)	28 (39%)	0	0
42	BY	108/119 (91%)	49 (45%)	20 (18%)	39 (36%)	0	0
43	BZ	175/253 (69%)	53 (30%)	52 (30%)	70 (40%)	0	0
44	BR	103/118 (87%)	35 (34%)	20 (19%)	48 (47%)	0	0
45	BU	115/118 (98%)	22 (19%)	23 (20%)	70 (61%)	0	0
46	BV	96/100 (96%)	39 (41%)	25 (26%)	32 (33%)	0	0
47	B2	62/70 (89%)	8 (13%)	9 (14%)	45 (73%)	0	0
48	B3	58/60 (97%)	24 (41%)	13 (22%)	21 (36%)	0	0
49	B0	84/91 (92%)	33 (39%)	17 (20%)	34 (40%)	0	0
50	B4	71/73 (97%)	21 (30%)	16 (22%)	34 (48%)	0	0
51	B5	56/60 (93%)	16 (29%)	17 (30%)	23 (41%)	0	0
52	B6	51/82 (62%)	21 (41%)	9 (18%)	21 (41%)	0	0
53	B7	44/47 (94%)	4 (9%)	7 (16%)	33 (75%)	0	0
54	B8	61/64 (95%)	22 (36%)	9 (15%)	30 (49%)	0	0
55	B9	33/36 (92%)	14 (42%)	9 (27%)	10 (30%)	0	0
56	BK	124/141 (88%)	92 (74%)	26 (21%)	6 (5%)	2	21
All	All	5318/6250 (85%)	2968 (56%)	1014 (19%)	1336 (25%)	0	1

5 of 1336 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	AB	24	TRP
5	AB	104	ASN
5	AB	153	ARG
5	AB	154	LEU
5	AB	161	ALA

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 X-ray entries followed by that with respect to entries of similar resolution.

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
5	AB	202/220 (92%)	173 (86%)	29 (14%)	3 16
6	AC	160/188 (85%)	146 (91%)	14 (9%)	10 31
7	AD	180/181 (99%)	162 (90%)	18 (10%)	7 26
8	AE	115/123 (94%)	94 (82%)	21 (18%)	1 10
9	AF	90/90 (100%)	83 (92%)	7 (8%)	12 36
10	AG	126/127 (99%)	116 (92%)	10 (8%)	12 36
11	AH	119/119 (100%)	91 (76%)	28 (24%)	1 4
12	AI	98/99 (99%)	90 (92%)	8 (8%)	11 34
13	AJ	88/92 (96%)	77 (88%)	11 (12%)	4 19
14	AK	90/99 (91%)	85 (94%)	5 (6%)	21 46
15	AL	104/111 (94%)	93 (89%)	11 (11%)	6 24
16	AM	100/101 (99%)	87 (87%)	13 (13%)	4 18
17	AN	49/50 (98%)	43 (88%)	6 (12%)	5 20
18	AO	79/80 (99%)	70 (89%)	9 (11%)	5 21
19	AP	72/74 (97%)	62 (86%)	10 (14%)	3 17
20	AQ	96/97 (99%)	87 (91%)	9 (9%)	8 28
21	AR	64/77 (83%)	57 (89%)	7 (11%)	6 23
22	AS	71/80 (89%)	64 (90%)	7 (10%)	8 26
23	AT	76/82 (93%)	68 (90%)	8 (10%)	7 24

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
24	AU	19/22 (86%)	19 (100%)	0	100	100
28	BD	135/135 (100%)	99 (73%)	36 (27%)	0	3
29	BE	156/284 (55%)	128 (82%)	28 (18%)	2	10
30	BF	152/193 (79%)	124 (82%)	28 (18%)	1	9
31	BG	102/147 (69%)	93 (91%)	9 (9%)	10	31
32	BH	137/147 (93%)	111 (81%)	26 (19%)	1	8
33	BI	119/119 (100%)	98 (82%)	21 (18%)	2	11
34	BN	95/121 (78%)	80 (84%)	15 (16%)	2	14
35	BO	101/101 (100%)	81 (80%)	20 (20%)	1	8
36	BP	67/126 (53%)	56 (84%)	11 (16%)	2	12
37	BQ	110/110 (100%)	83 (76%)	27 (24%)	0	4
38	BS	89/149 (60%)	73 (82%)	16 (18%)	1	10
39	BT	44/52 (85%)	30 (68%)	14 (32%)	0	2
40	BW	88/92 (96%)	74 (84%)	14 (16%)	2	13
41	BX	67/73 (92%)	44 (66%)	23 (34%)	0	1
42	BY	97/105 (92%)	80 (82%)	17 (18%)	2	11
43	BZ	151/203 (74%)	130 (86%)	21 (14%)	3	17
44	BR	89/101 (88%)	71 (80%)	18 (20%)	1	7
45	BU	96/97 (99%)	68 (71%)	28 (29%)	0	2
46	BV	79/79 (100%)	69 (87%)	10 (13%)	4	18
47	B2	51/56 (91%)	37 (72%)	14 (28%)	0	3
48	B3	52/52 (100%)	47 (90%)	5 (10%)	8	27
49	B0	64/67 (96%)	57 (89%)	7 (11%)	6	23
50	B4	66/66 (100%)	54 (82%)	12 (18%)	1	10
51	B5	51/53 (96%)	43 (84%)	8 (16%)	2	14
52	B6	46/69 (67%)	39 (85%)	7 (15%)	3	14
53	B7	39/40 (98%)	31 (80%)	8 (20%)	1	7
54	B8	50/51 (98%)	39 (78%)	11 (22%)	1	6
55	B9	34/35 (97%)	30 (88%)	4 (12%)	5	20
56	BK	108/113 (96%)	105 (97%)	3 (3%)	43	65
All	All	4533/5148 (88%)	3841 (85%)	692 (15%)	2	14

5 of 692 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
38	BS	87	LEU
44	BR	107	ASP
39	BT	25	ASP
38	BS	83	LEU
42	BY	31	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 131 such sidechains are listed below:

Mol	Chain	Res	Type
46	BV	86	HIS
48	B3	52	HIS
55	B9	29	ASN
23	AT	73	HIS
23	AT	26	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	AA	1496/1522 (98%)	518 (34%)	159 (10%)
2	AV	75/76 (98%)	17 (22%)	2 (2%)
26	BB	122/123 (99%)	44 (36%)	3 (2%)
27	BA	2779/2916 (95%)	1485 (53%)	361 (12%)
3	AW	68/76 (89%)	13 (19%)	4 (5%)
4	AX	5/18 (27%)	0	0
All	All	4545/4731 (96%)	2077 (45%)	529 (11%)

5 of 2077 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	AA	6	G
1	AA	7	G
1	AA	8	A
1	AA	9	G
1	AA	12	U

5 of 529 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
27	BA	2481	G

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Mol	Chain	Res	Type
27	BA	2555	U
27	BA	2472	G
27	BA	2849	U
27	BA	265	A

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

3 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
3	PSU	AW	39	3	18,21,22	0.72	0	22,30,33	0.68	0
3	YYG	AW	37	3,10	31,42,43	0.93	1 (3%)	33,62,65	2.60	10 (30%)
3	PSU	AW	55	3	18,21,22	0.72	0	22,30,33	0.86	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PSU	AW	39	3	-	0/7/25/26	0/2/2/2
3	YYG	AW	37	3,10	1/1/8/9	7/20/42/43	0/3/4/4
3	PSU	AW	55	3	-	0/7/25/26	0/2/2/2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	AW	37	YYG	C8-N7	-2.22	1.31	1.35

The worst 5 of 10 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	AW	37	YYG	C11-C12-N1	8.62	111.39	106.53
3	AW	37	YYG	C24-O23-C21	6.34	123.15	115.66
3	AW	37	YYG	C3-N3-C4	4.99	125.57	116.71
3	AW	37	YYG	O23-C21-N20	4.36	118.46	110.80
3	AW	37	YYG	C4-N3-C2	-3.39	111.86	122.15

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	AW	37	YYG	C15

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	AW	37	YYG	C12-C13-C14-C15
3	AW	37	YYG	C15-C16-O18-C19
3	AW	37	YYG	O17-C16-O18-C19
3	AW	37	YYG	C13-C14-C15-C16
3	AW	37	YYG	C14-C15-C16-O18

There are no ring outliers.

2 monomers are involved in 33 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	AW	39	PSU	2	0
3	AW	37	YYG	31	0

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
27	BA	118
1	AA	67
3	AW	9
56	BK	6
2	AV	5
37	BQ	3
28	BD	2
16	AM	2
46	BV	2
50	B4	2
38	BS	2
5	AB	2
40	BW	2
7	AD	2
30	BF	2
20	AQ	2
8	AE	1
36	BP	1
54	B8	1
26	BB	1
43	BZ	1
49	B0	1
6	AC	1
33	BI	1
32	BH	1
14	AK	1
45	BU	1
15	AL	1

The worst 5 of 240 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	BK	70:ILE	C	71:LYS	N	5.81
1	BK	71:LYS	C	72:THR	N	5.77
1	AW	73:A	O3'	74:C	P	5.46
1	BK	73:PRO	C	74:PRO	N	5.30
1	BK	72:THR	C	73:PRO	N	5.11

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	AA	1515/1522 (99%)	0.61	131 (8%) 10 13	208, 348, 400, 400	0
2	AV	76/76 (100%)	0.57	5 (6%) 18 18	208, 360, 393, 393	0
3	AW	73/76 (96%)	1.02	15 (20%) 1 3	342, 400, 400, 400	0
4	AX	17/18 (94%)	3.51	12 (70%) 0 0	399, 399, 399, 399	0
5	AB	234/256 (91%)	0.01	5 (2%) 63 56	400, 400, 400, 400	0
6	AC	206/239 (86%)	0.34	21 (10%) 6 10	398, 400, 400, 400	0
7	AD	208/209 (99%)	0.28	17 (8%) 11 14	311, 385, 400, 400	0
8	AE	150/162 (92%)	0.31	14 (9%) 8 11	335, 400, 400, 400	0
9	AF	101/101 (100%)	0.15	6 (5%) 22 22	400, 400, 400, 400	0
10	AG	155/156 (99%)	0.44	15 (9%) 7 11	376, 395, 395, 395	0
11	AH	138/138 (100%)	0.03	9 (6%) 18 18	389, 389, 389, 389	0
12	AI	127/128 (99%)	0.86	22 (17%) 1 4	400, 400, 400, 400	0
13	AJ	98/105 (93%)	1.37	19 (19%) 1 3	399, 399, 399, 399	0
14	AK	119/129 (92%)	-0.27	3 (2%) 57 50	250, 250, 400, 400	0
15	AL	124/135 (91%)	0.42	14 (11%) 5 9	383, 383, 397, 397	0
16	AM	125/126 (99%)	0.87	19 (15%) 2 5	400, 400, 400, 400	0
17	AN	60/61 (98%)	0.55	8 (13%) 3 7	398, 398, 398, 398	0
18	AO	88/89 (98%)	0.75	14 (15%) 1 5	392, 392, 392, 392	0
19	AP	83/88 (94%)	1.36	21 (25%) 0 2	394, 394, 394, 394	0
20	AQ	104/105 (99%)	0.66	7 (6%) 17 18	397, 397, 400, 400	0
21	AR	73/88 (82%)	0.58	10 (13%) 3 6	400, 400, 400, 400	0
22	AS	80/93 (86%)	1.04	14 (17%) 1 4	395, 395, 395, 395	0
23	AT	99/106 (93%)	0.32	12 (12%) 4 8	400, 400, 400, 400	0
24	AU	24/27 (88%)	0.55	1 (4%) 36 33	400, 400, 400, 400	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
25	AY	365/365 (100%)	0.77	71 (19%) 1 3	340, 396, 400, 400	0
26	BB	123/123 (100%)	0.18	1 (0%) 86 79	242, 265, 342, 342	0
27	BA	2814/2916 (96%)	0.28	103 (3%) 41 37	67, 222, 387, 400	0
28	BD	173/173 (100%)	0.02	8 (4%) 32 30	398, 398, 400, 400	0
29	BE	191/338 (56%)	0.30	15 (7%) 12 14	388, 400, 400, 400	0
30	BF	189/246 (76%)	0.08	6 (3%) 47 41	398, 398, 399, 399	0
31	BG	122/176 (69%)	0.57	15 (12%) 4 8	400, 400, 400, 400	0
32	BH	164/177 (92%)	0.03	8 (4%) 29 28	399, 399, 400, 400	0
33	BI	148/149 (99%)	0.35	13 (8%) 10 12	400, 400, 400, 400	0
34	BN	117/145 (80%)	0.20	8 (6%) 17 18	388, 388, 388, 388	0
35	BO	122/122 (100%)	0.14	7 (5%) 23 24	400, 400, 400, 400	0
36	BP	84/164 (51%)	0.05	2 (2%) 59 52	400, 400, 400, 400	0
37	BQ	138/138 (100%)	0.70	17 (12%) 4 8	391, 391, 391, 391	0
38	BS	113/186 (60%)	0.23	11 (9%) 7 11	275, 370, 400, 400	0
39	BT	52/66 (78%)	1.20	15 (28%) 0 2	400, 400, 400, 400	0
40	BW	108/113 (95%)	-0.23	0 100 100	275, 277, 400, 400	0
41	BX	76/84 (90%)	0.15	7 (9%) 9 11	400, 400, 400, 400	0
42	BY	110/119 (92%)	0.69	14 (12%) 3 7	400, 400, 400, 400	0
43	BZ	177/253 (69%)	-0.09	4 (2%) 60 54	376, 376, 379, 379	0
44	BR	105/118 (88%)	-0.27	1 (0%) 82 75	345, 345, 345, 345	0
45	BU	117/118 (99%)	-0.38	2 (1%) 70 62	356, 356, 392, 392	0
46	BV	100/100 (100%)	-0.30	0 100 100	385, 385, 400, 400	0
47	B2	64/70 (91%)	-0.63	0 100 100	287, 287, 287, 287	0
48	B3	60/60 (100%)	0.15	3 (5%) 28 28	343, 343, 343, 343	0
49	B0	86/91 (94%)	-0.14	1 (1%) 79 71	400, 400, 400, 400	0
50	B4	73/73 (100%)	0.62	10 (13%) 3 6	400, 400, 400, 400	0
51	B5	58/60 (96%)	0.03	2 (3%) 45 40	400, 400, 400, 400	0
52	B6	53/82 (64%)	-0.25	1 (1%) 66 59	400, 400, 400, 400	0
53	B7	46/47 (97%)	-0.08	2 (4%) 35 32	400, 400, 400, 400	0
54	B8	63/64 (98%)	0.07	2 (3%) 47 41	400, 400, 400, 400	0
55	B9	35/36 (97%)	0.65	4 (11%) 5 9	400, 400, 400, 400	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
56	BK	133/141 (94%)	1.06	33 (24%) 0 2	397, 400, 400, 400	0
All	All	10456/11346 (92%)	0.36	800 (7%) 13 15	67, 388, 400, 400	0

The worst 5 of 800 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
13	AJ	73	ASP	13.5
12	AI	15	ALA	12.0
16	AM	123	ALA	10.2
25	AY	31	ARG	10.2
25	AY	187	HIS	9.8

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	YYG	AW	37	39/40	0.35	0.69	400,400,400,400	0
3	PSU	AW	39	20/21	0.52	0.53	400,400,400,400	0
3	PSU	AW	55	20/21	0.86	0.20	400,400,400,400	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.