



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 6, 2026 – 07:35 PM UTC

PDB ID : 4V4S / pdb_00004v4s
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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

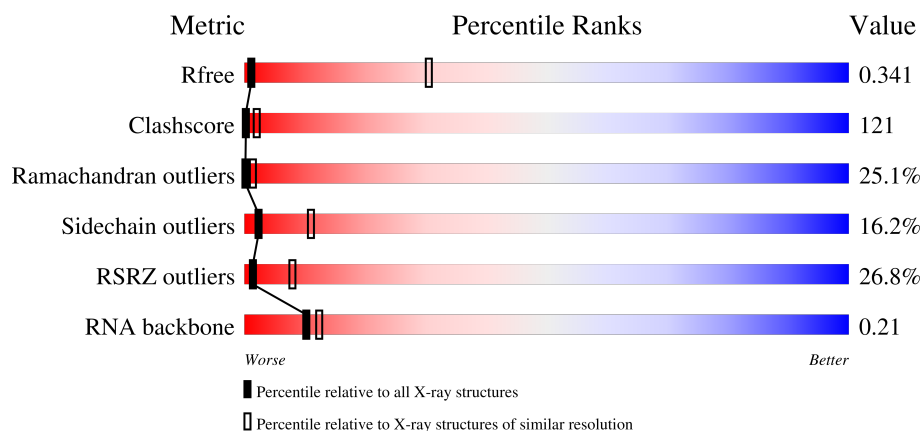
1 Overall quality at a glance

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}	180053	1165 (9.50-4.00)
Clashscore	190562	1003 (9.44-4.04)
Ramachandran outliers	187476	1052 (9.50-4.00)
Sidechain outliers	187428	1015 (9.50-4.00)
RSRZ outliers	180081	1158 (9.50-4.00)
RNA backbone	3983	1056 (10.00-3.10)

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	-

2 Entry composition

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
1	AA	1515	Total	C	N	O	P	0	0	0
			32551	14490	6022	10525	1514			

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
2	AV	76	Total	C	N	O	P	0	0	0
			1622	725	293	529	75			

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

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

- 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
4	AX	17	Total	C	N	O	P	0	0	11
			136	56	19	44	17			

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
13	AJ	98	Total	C	N	O	S			
			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
14	AK	119	Total	C	N	O	S			
			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
15	AL	124	Total	C	N	O	S			
			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
16	AM	125	Total	C	N	O	S			
			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
17	AN	60	Total	C	N	O	S			
			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
18	AO	88	Total	C	N	O	S			
			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
19	AP	83	Total	C	N	O	S	0	0	0
			700	443	139	117	1			

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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
27	BA	2814	Total	C	N	O	P	0	0	0
			60599	26974	11331	19482	2812			

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
28	BD	173	Total	C	N	O	S	0	0	0
			1308	820	246	236	6			

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- 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.

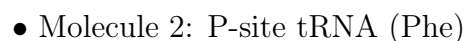
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
54	B8	63	Total	C	N	O	S	0	0	0
			496	312	101	78	5			

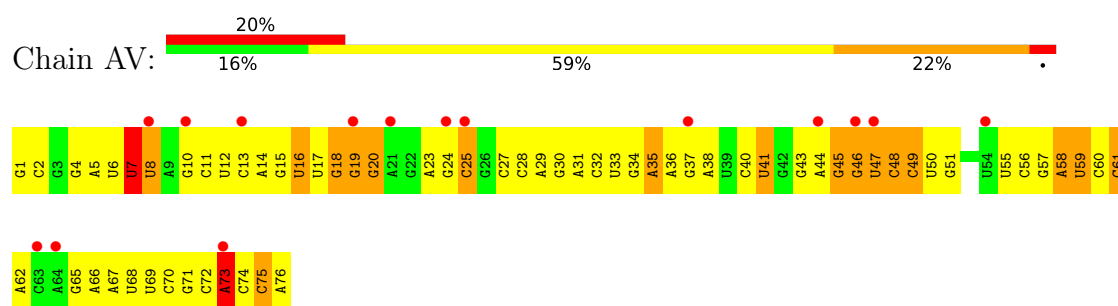
- Molecule 55 is a protein called 50S ribosomal protein L36.

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

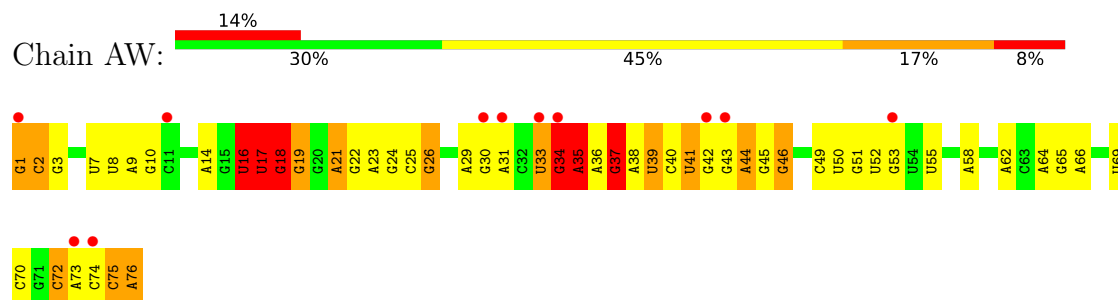
- Molecule 56 is a protein called 50S ribosomal protein L11.

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

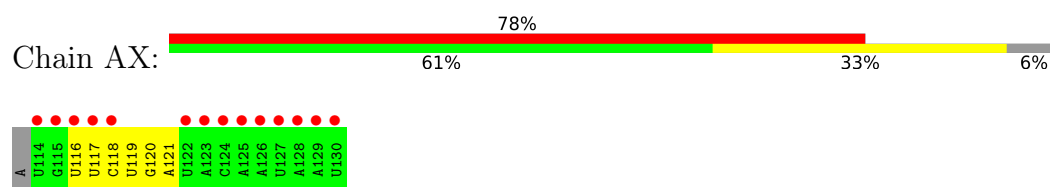




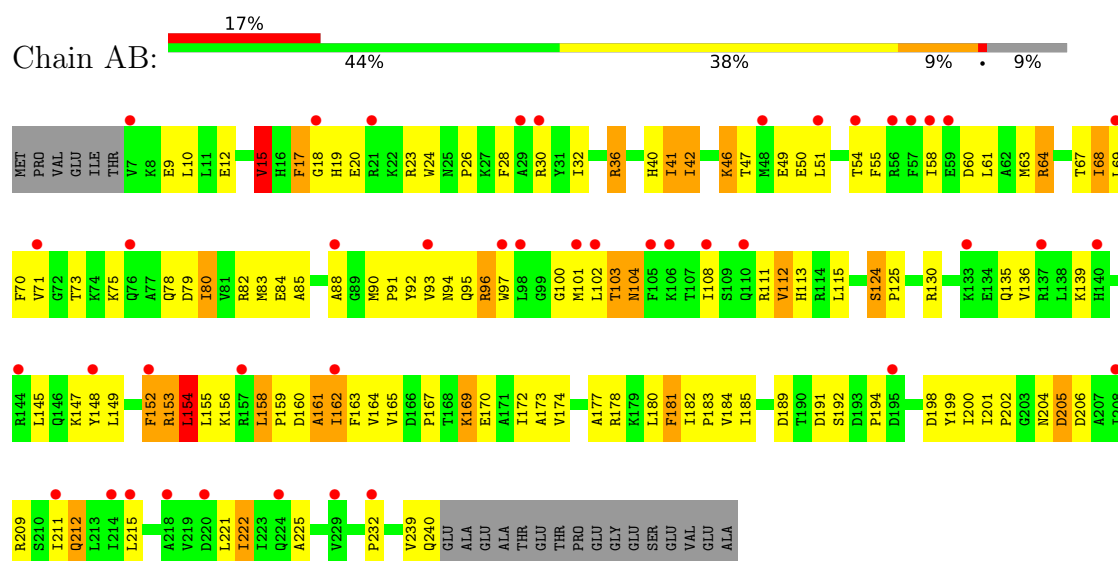
• Molecule 3: E-site tRNA (Phe)



• 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'

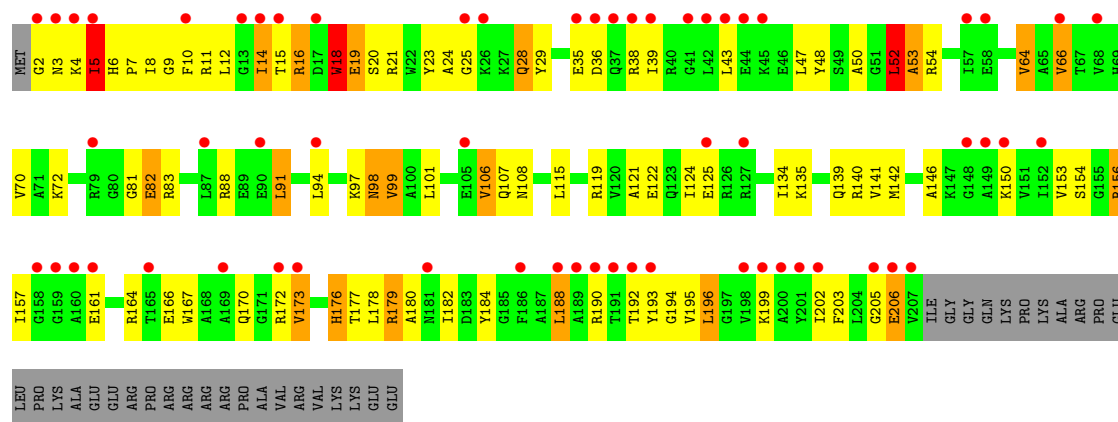


• Molecule 5: 30S ribosomal protein S2

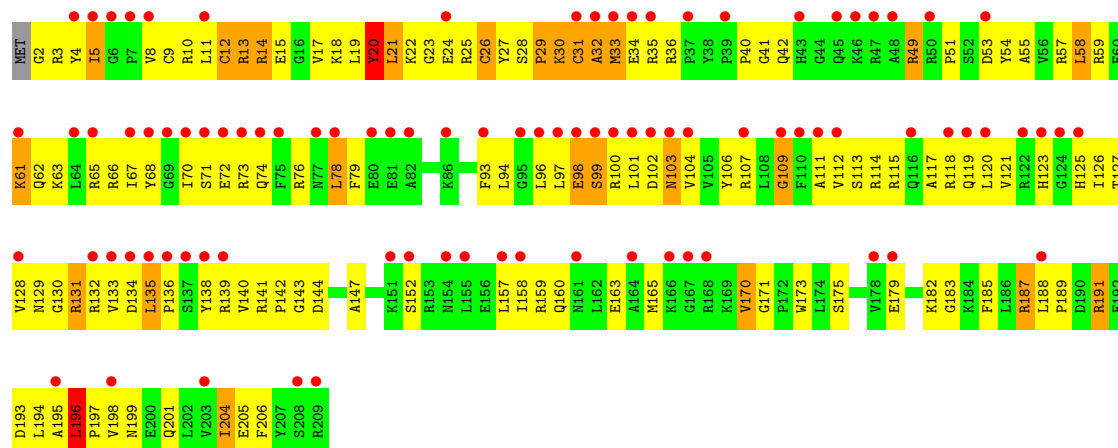


• Molecule 6: 30S ribosomal protein S3

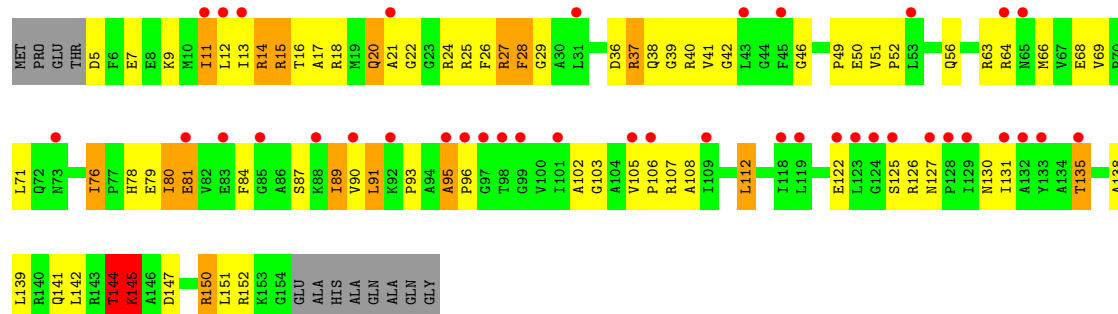




• Molecule 7: 30S ribosomal protein S4

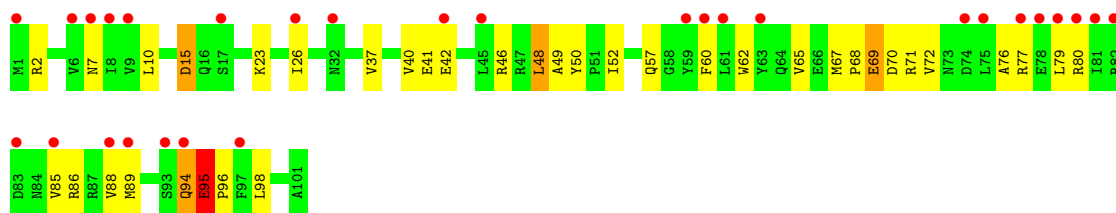


• Molecule 8: 30S ribosomal protein S5

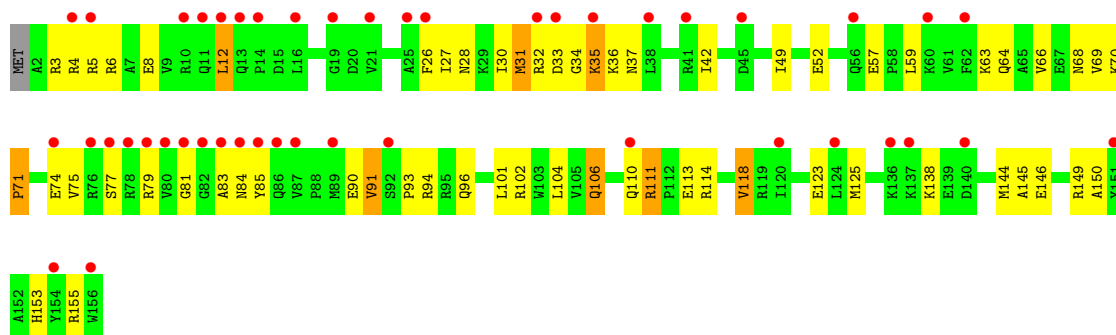


• Molecule 9: 30S ribosomal protein S6

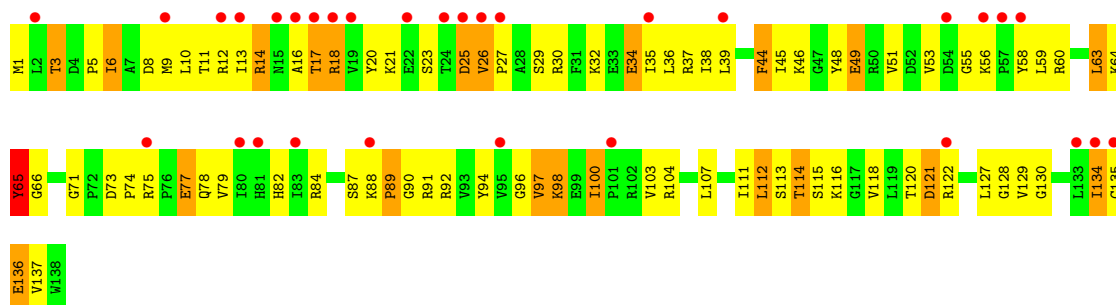




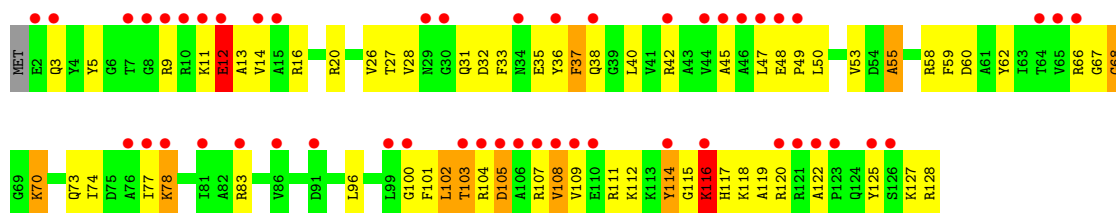
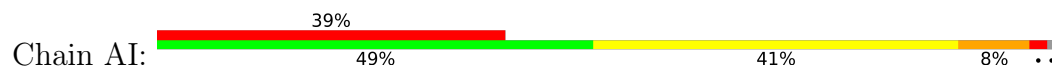
• Molecule 10: 30S ribosomal protein S7



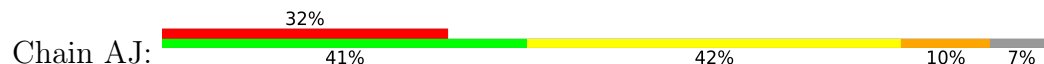
• Molecule 11: 30S ribosomal protein S8

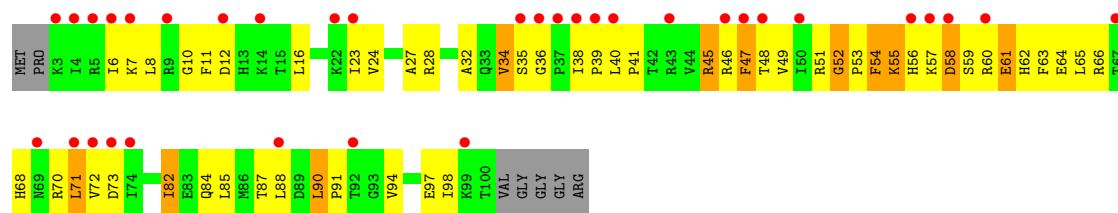


• Molecule 12: 30S ribosomal protein S9

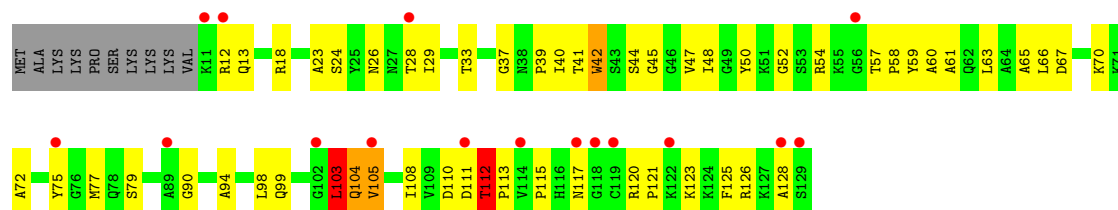


• Molecule 13: 30S ribosomal protein S10

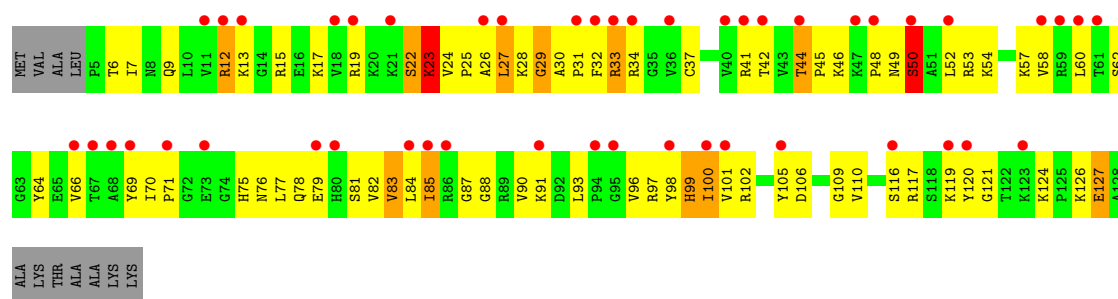




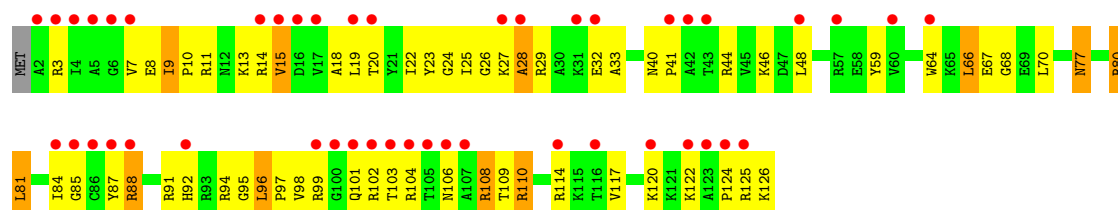
• Molecule 14: 30S ribosomal protein S11



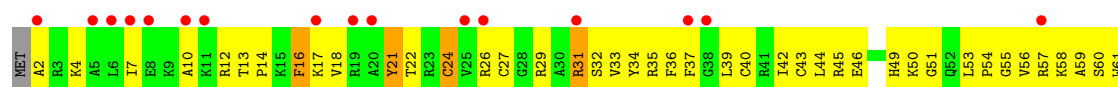
• Molecule 15: 30S ribosomal protein S12



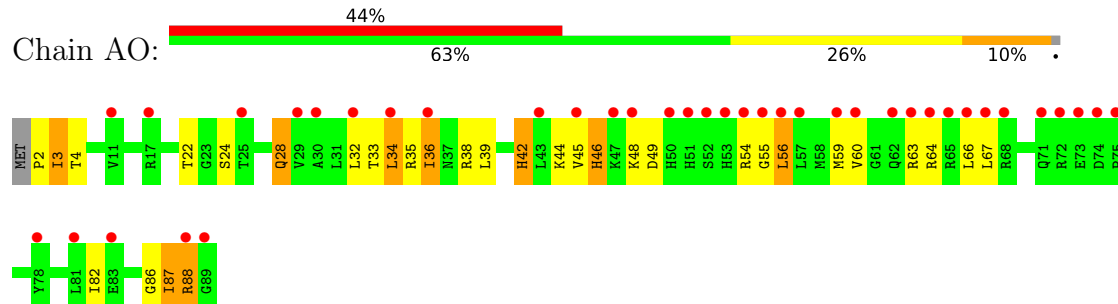
• Molecule 16: 30S ribosomal protein S13



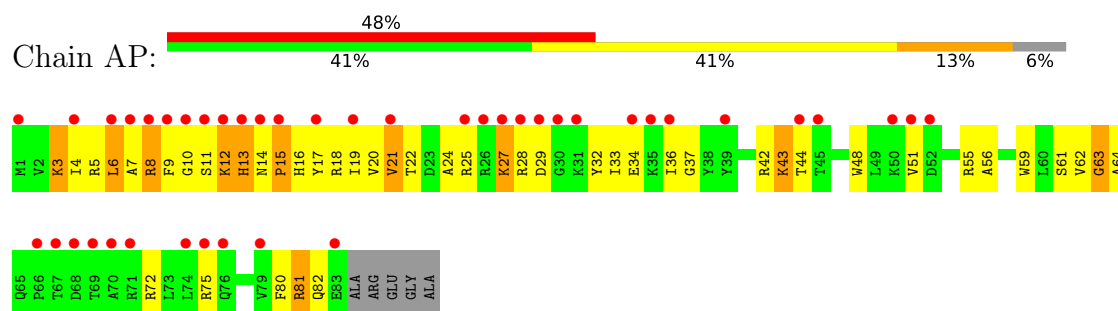
• Molecule 17: 30S ribosomal protein S14



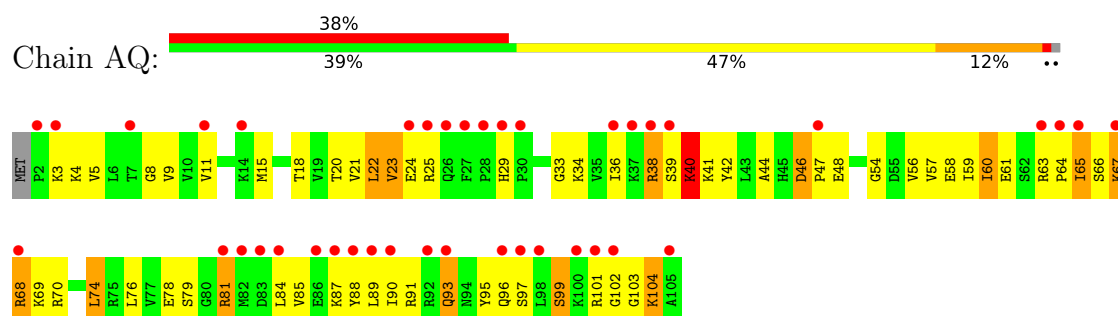
- Molecule 18: 30S ribosomal protein S15



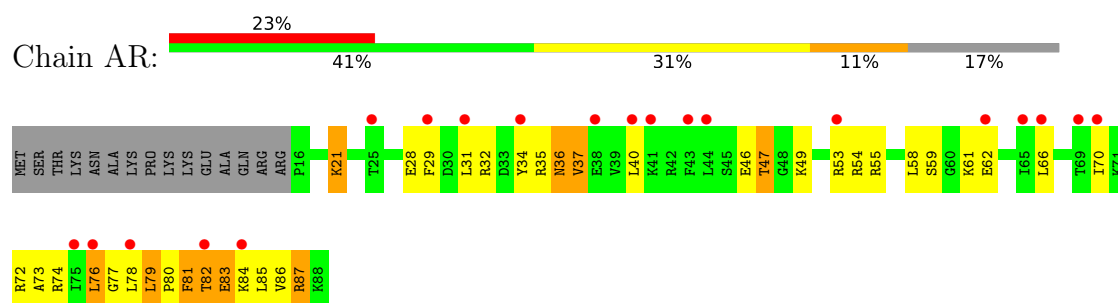
- Molecule 19: 30S ribosomal protein S16



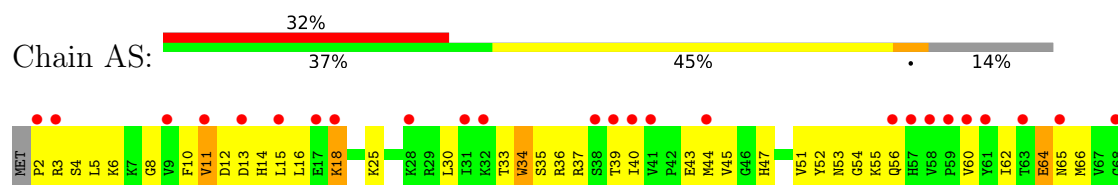
- Molecule 20: 30S ribosomal protein S17



- Molecule 21: 30S ribosomal protein S18

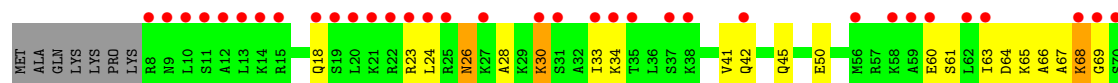


- Molecule 22: 30S ribosomal protein S19

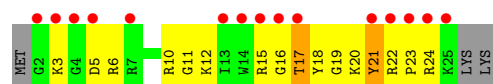




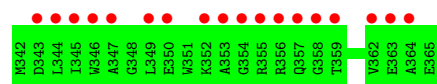
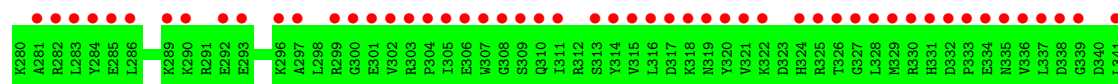
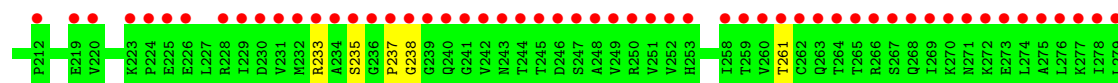
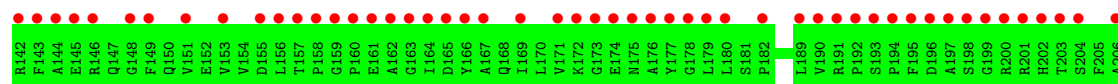
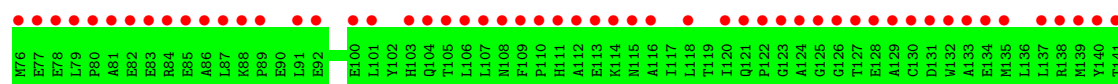
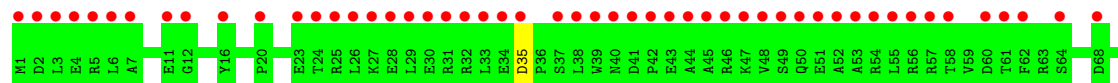
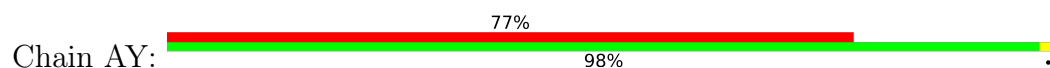
• Molecule 23: 30S ribosomal protein S20



• Molecule 24: 30S ribosomal protein Thx

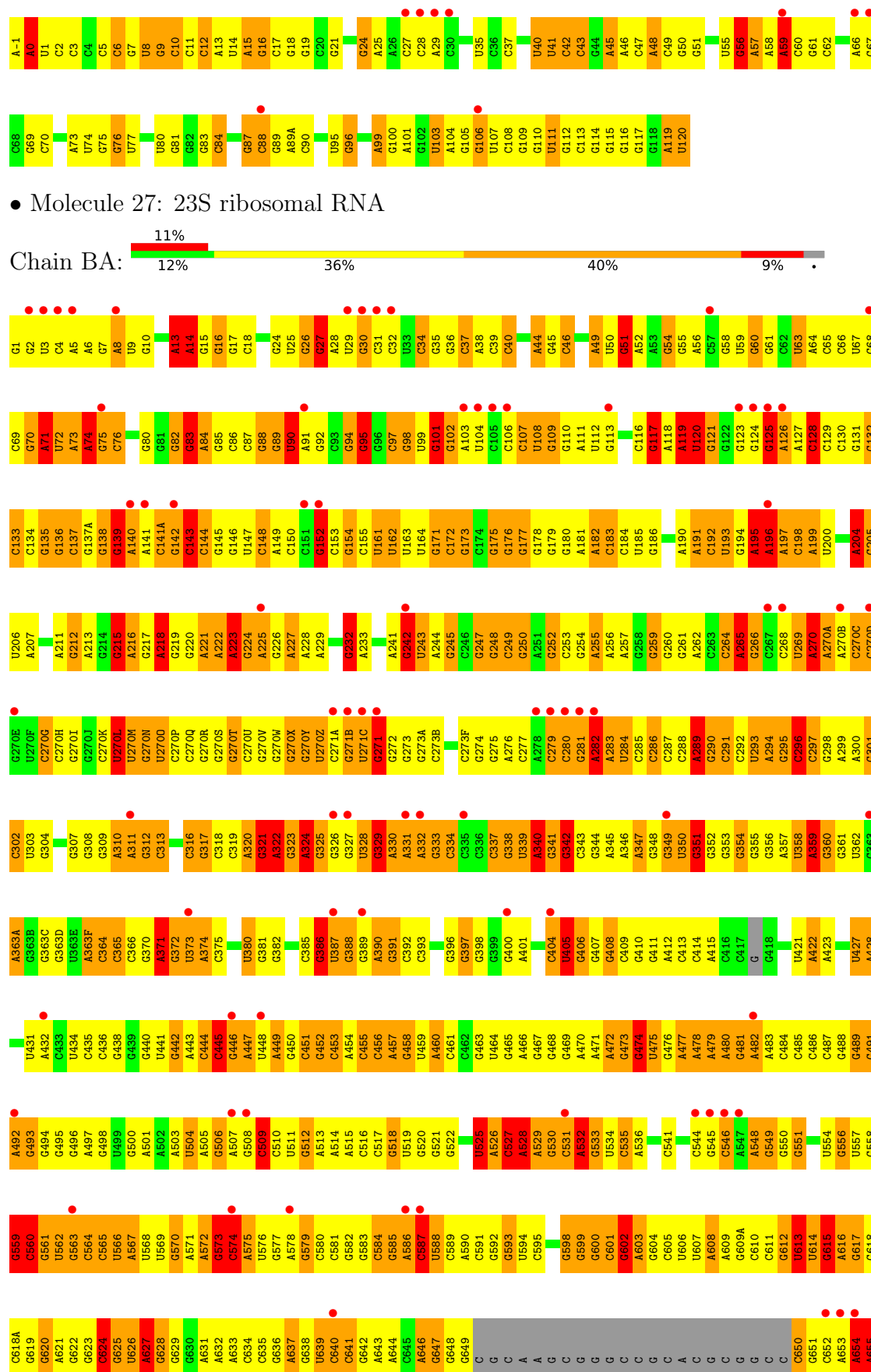


• Molecule 25: Peptide chain release factor 2



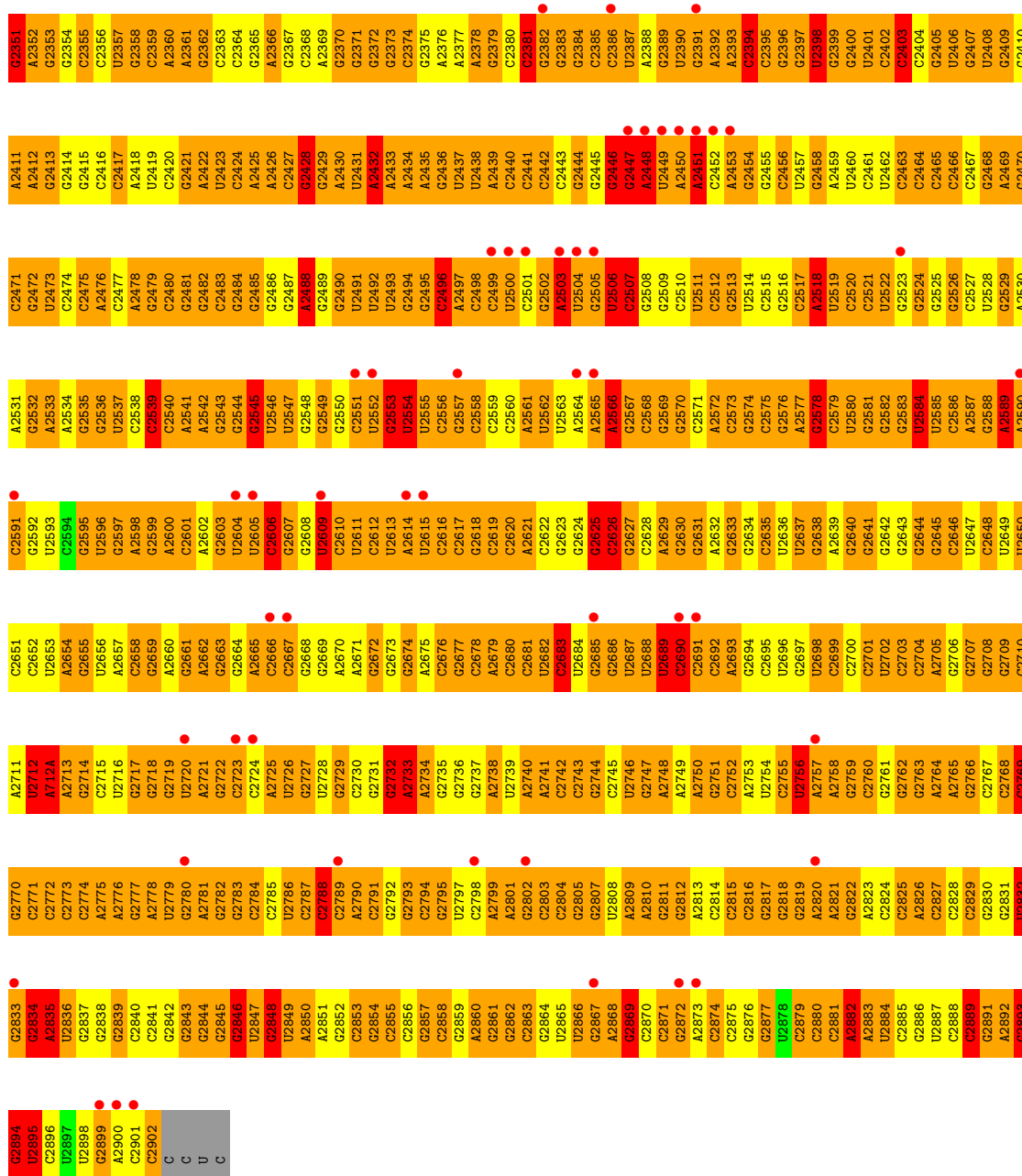
• Molecule 26: 5S ribosomal RNA



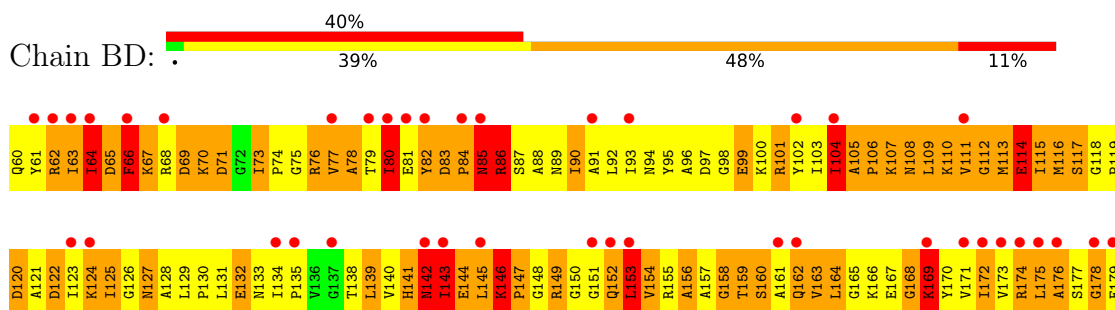


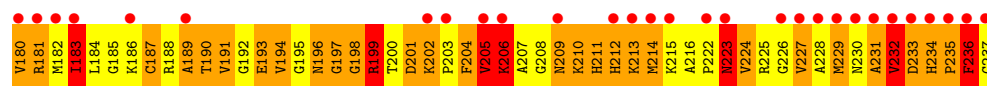


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C2293	U2233	C	C2103	C2043	G1980	A1918	C1843	A1783	C1703	G1642	C1574	A1510
C2294	U2234	C	G2104	C2044	G1981	A1919	C1844	A1784	G1704	G1643	C1575	A1511
C2295	G2235	G	C2105	G2045	C1982	A1920	A1847	A1785	G1705	G1644	U1576	G1512
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C2297	G2237	U	C	U2047	G1984	G1922	A1848	A1787	G1707	G1646	U1578	U1514
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G2302	G2242	U	G	G2052	U1991	A1927	G1854	A1792	G1712	G1651	A1583	G1519
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C2306	G2246	A	G	G2056	U1995	U1931	A1858	U1796	U1727	A1655	C1588	U1523
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C2308	C2248	C	U	G2058	G1997	G1933	G1860	U1798	U1730	C1657	G1595	G1525
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G2325	U2265	A	A	U2075	A2015	G1950	G1888	A1815	A1755	G1674	G1613	A1543
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A2333	A2273	U	U	G2083	G2023	C1958	G1898	G1823	G1763	C1683	G1824	G1552
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G2338	A2278	G	G	C2088	U2028	U1963	G1904	A1828	U1768	G1688	U1629	C1557
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C2345	C2285	G	G	C2095	G2035	A1970	G1910	G1835	U1775	G1695	A1635	A1567
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G2349	C2289	G	G	U2099	C2039	C1974	C1914	C1839	U1779	G1699	A1638	A1571
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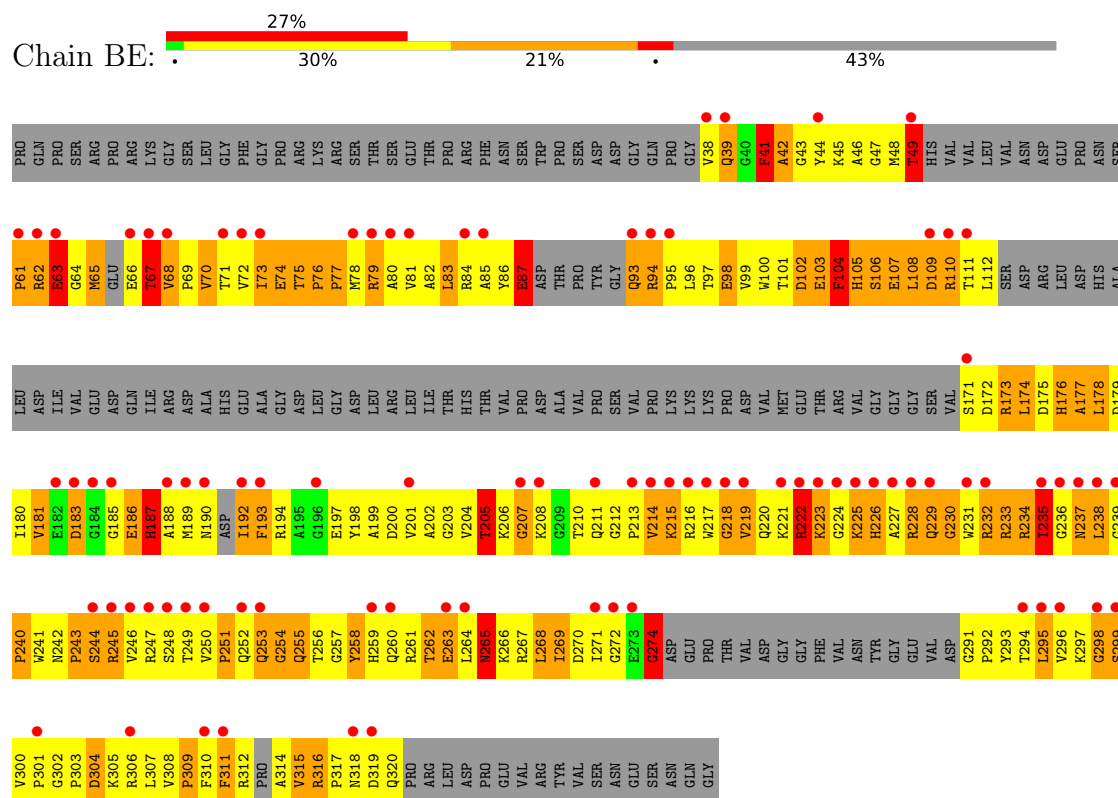


• Molecule 28: 50S ribosomal protein L2

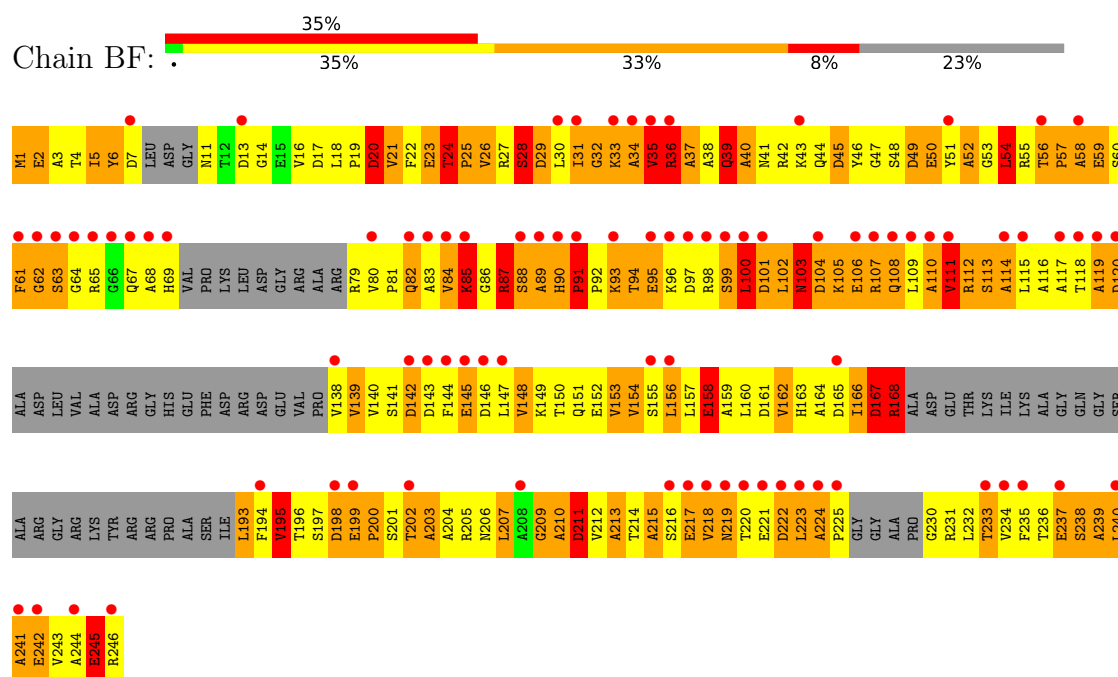




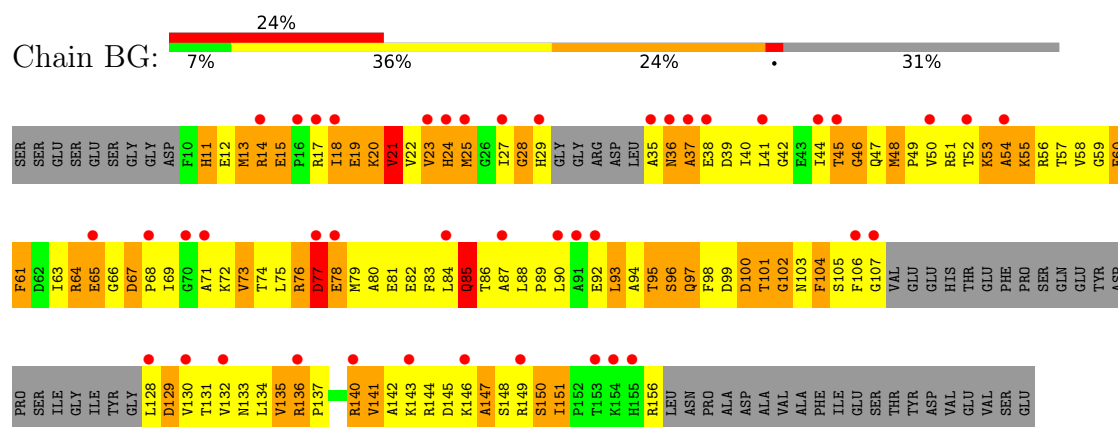
• Molecule 29: 50S ribosomal protein L3



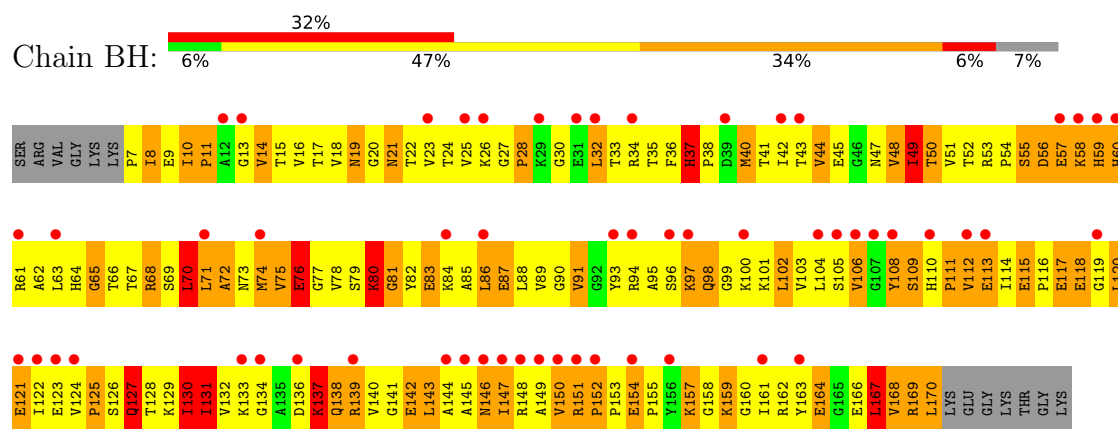
• Molecule 30: 50S ribosomal protein L4



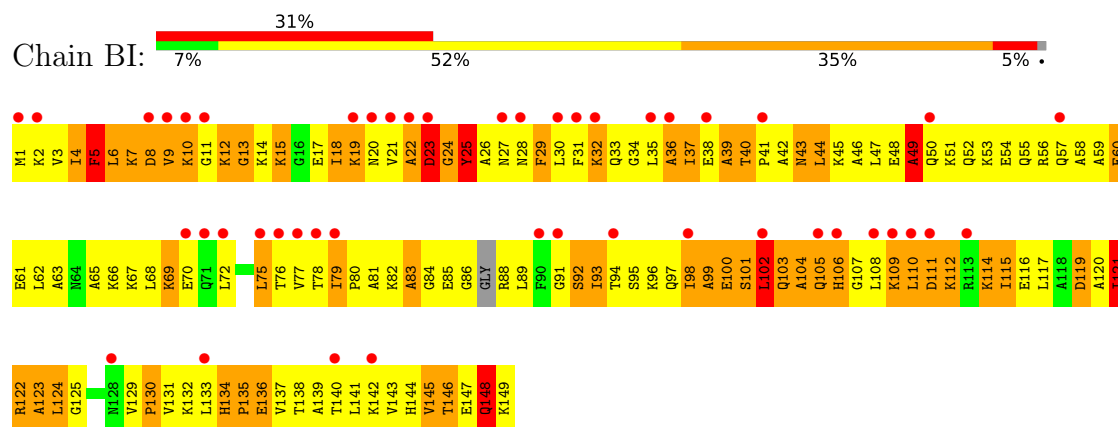
• Molecule 31: 50S ribosomal protein L5



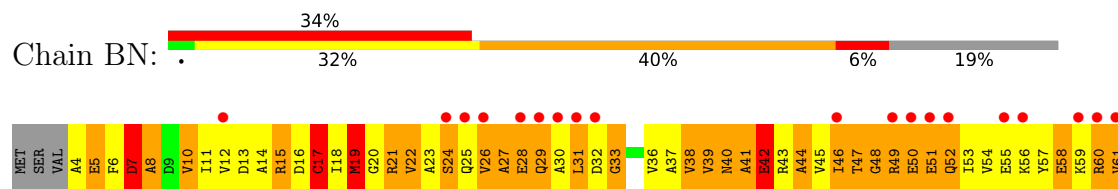
• Molecule 32: 50S ribosomal protein L6

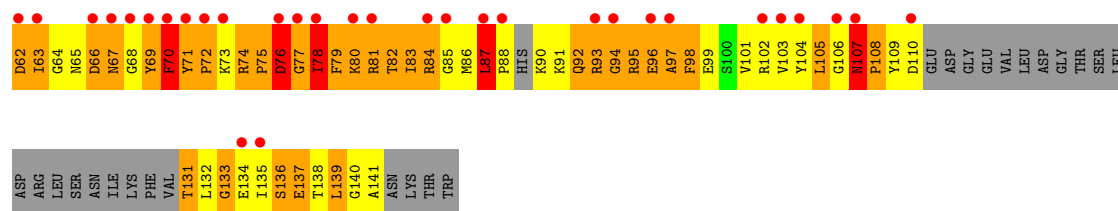


• Molecule 33: 50S ribosomal protein L9

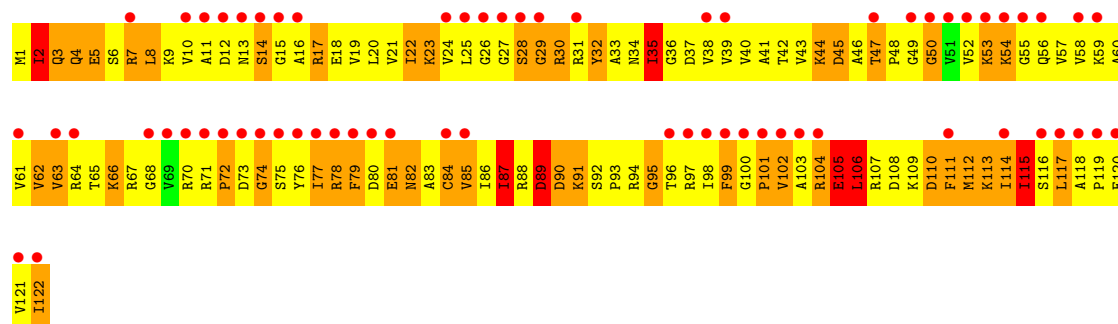


• Molecule 34: 50S ribosomal protein L13

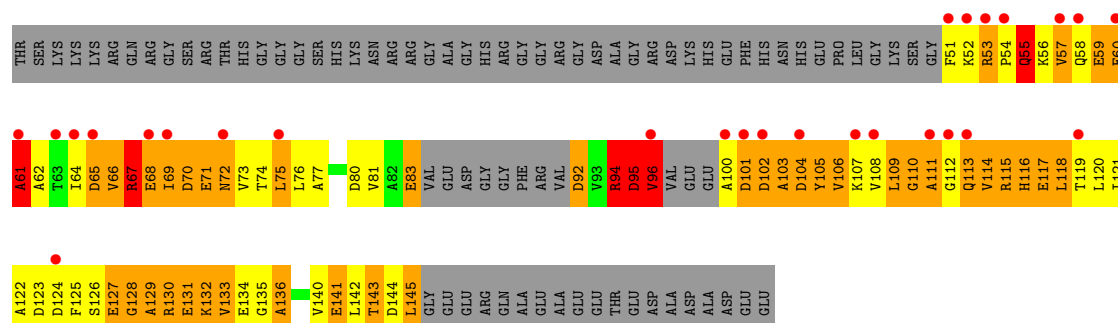
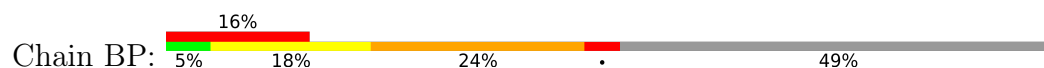




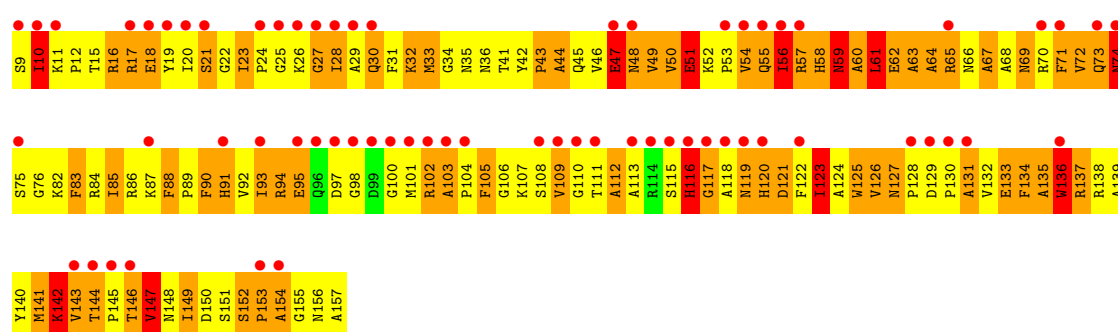
• Molecule 35: 50S ribosomal protein L14



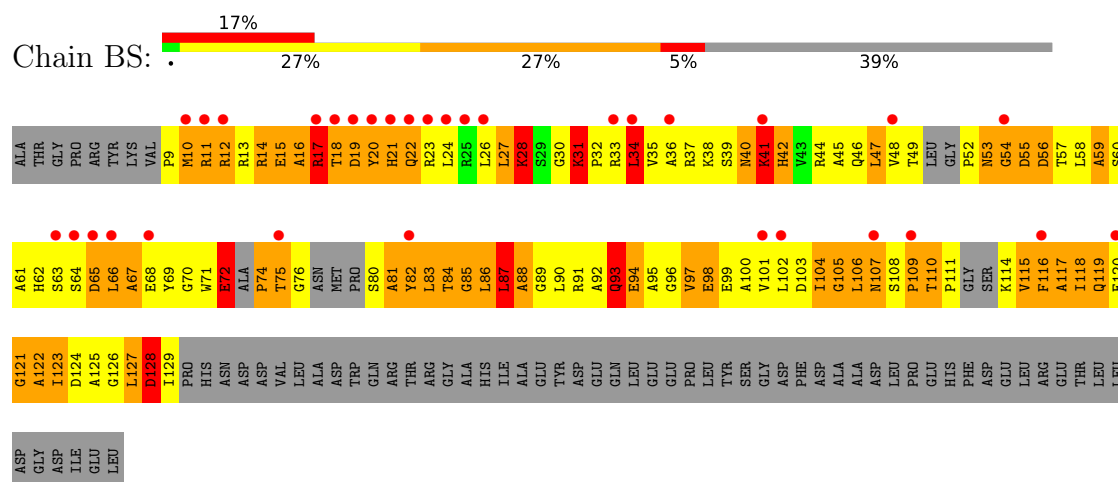
• Molecule 36: 50S ribosomal protein L15



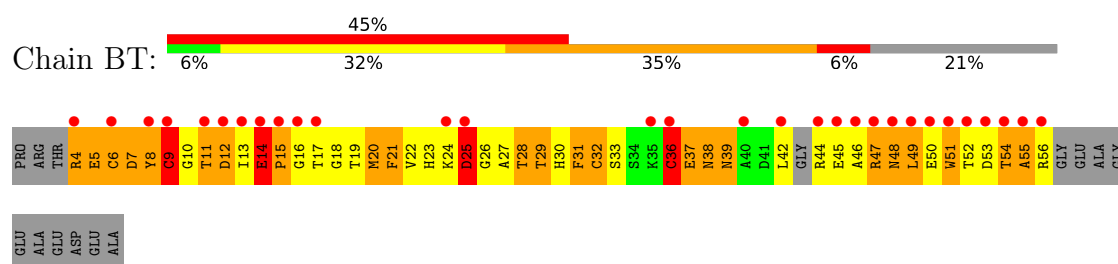
• Molecule 37: 50S ribosomal protein L16



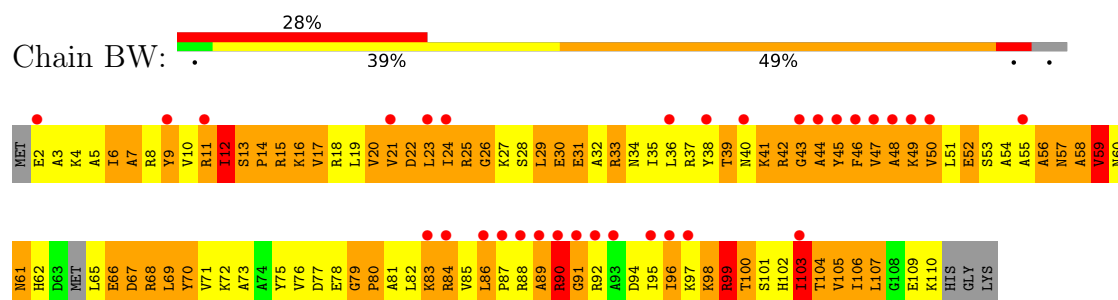
- Molecule 38: 50S ribosomal protein L18



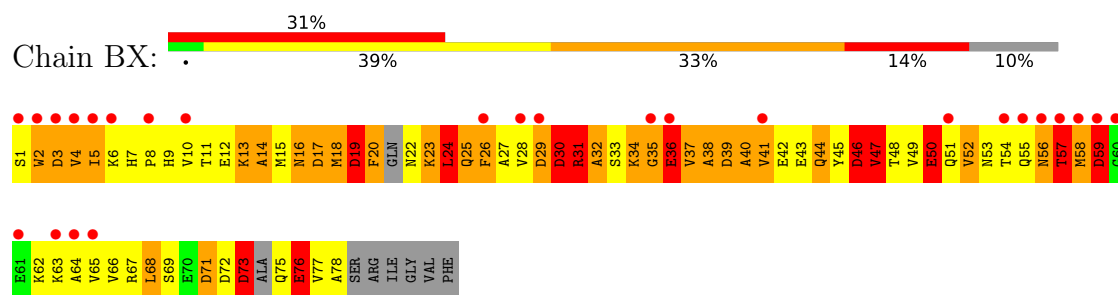
- Molecule 39: 50S ribosomal protein L19



- Molecule 40: 50S ribosomal protein L22

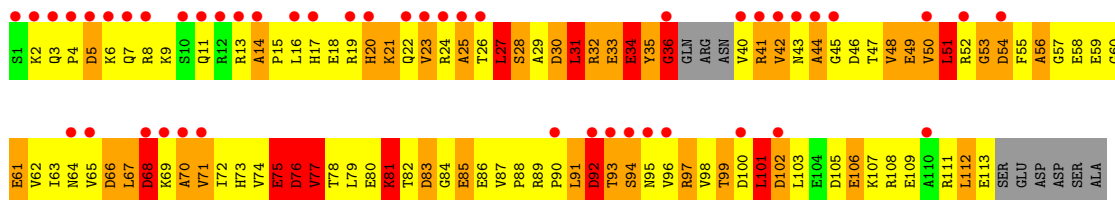


- Molecule 41: 50S ribosomal protein L23

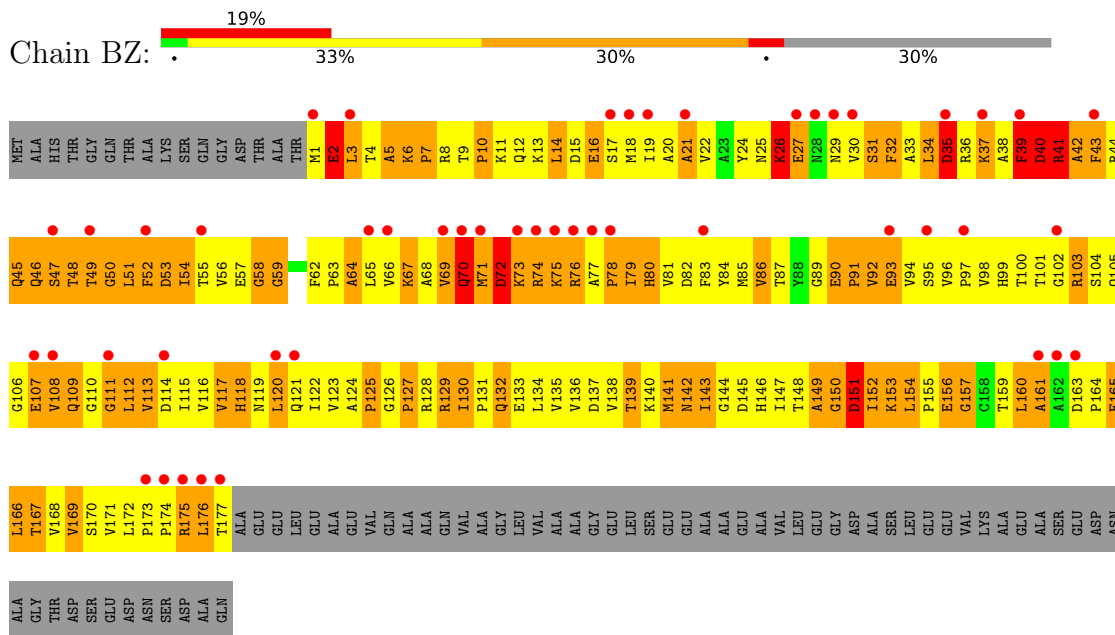


- Molecule 42: 50S ribosomal protein 24

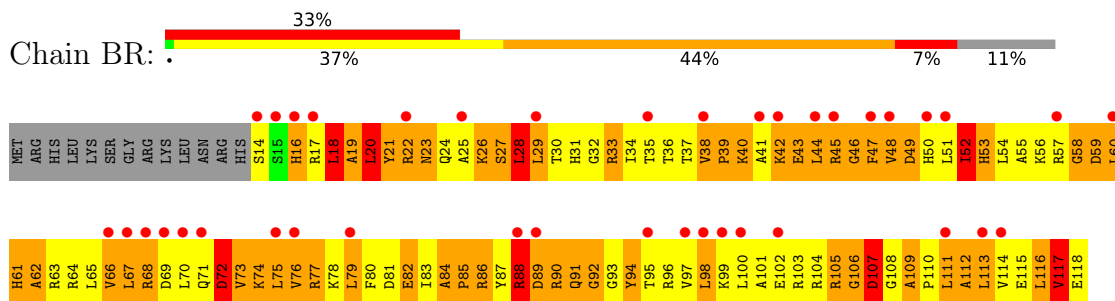




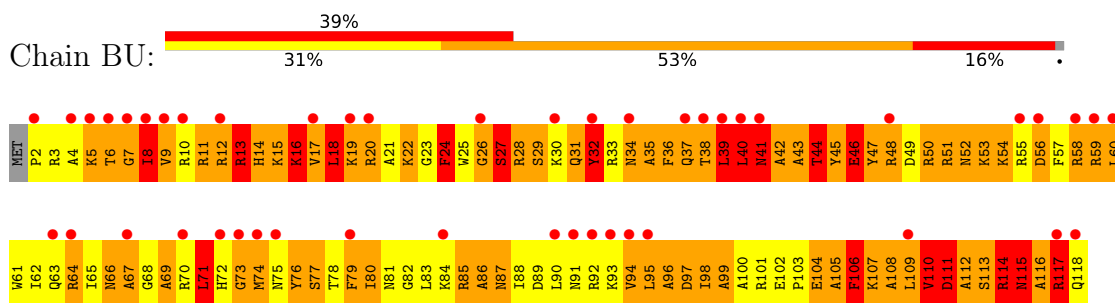
• Molecule 43: 50S ribosomal protein CTC



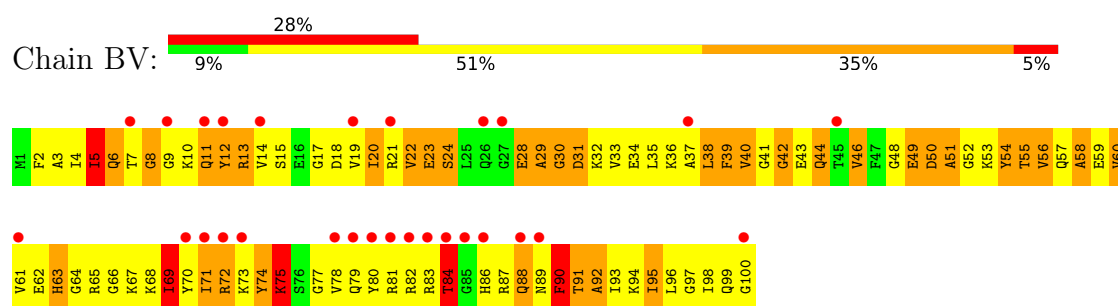
• Molecule 44: 50S ribosomal protein L17



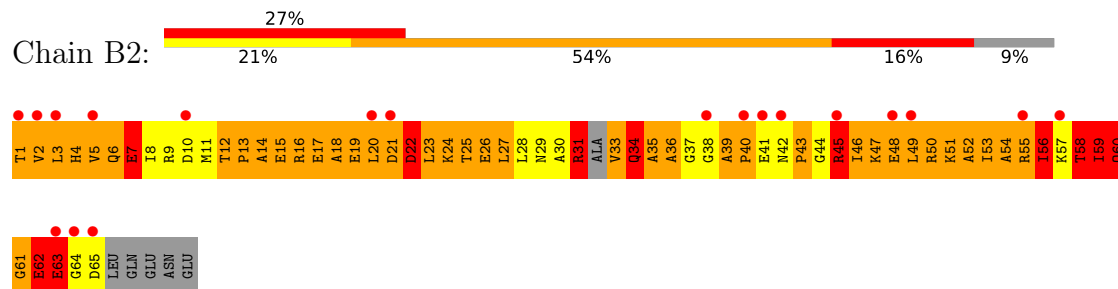
• Molecule 45: 50S ribosomal protein L20



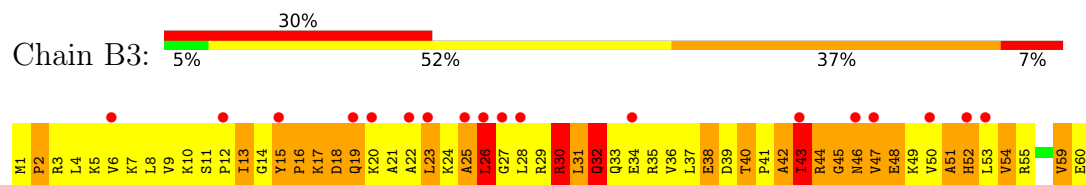
• Molecule 46: 50S ribosomal protein L21



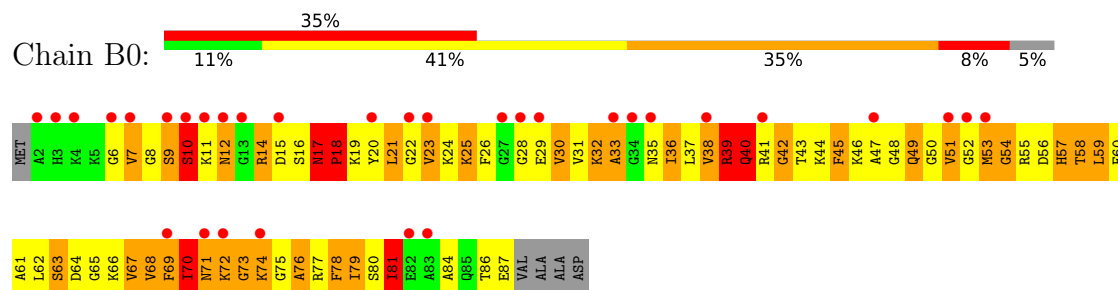
• Molecule 47: 50S ribosomal protein L29



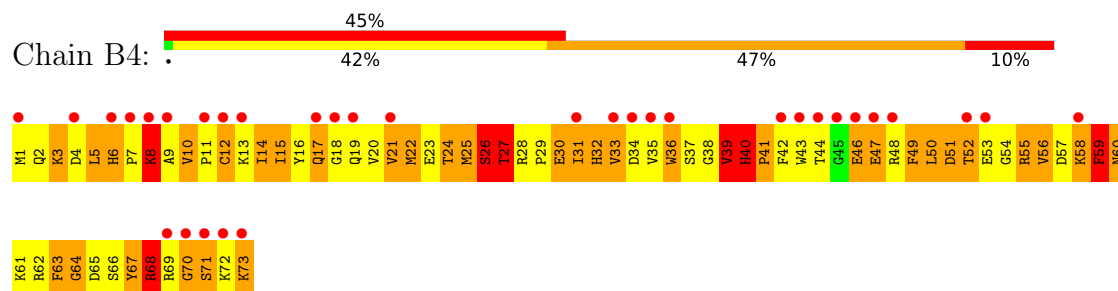
• Molecule 48: 50S ribosomal protein L30



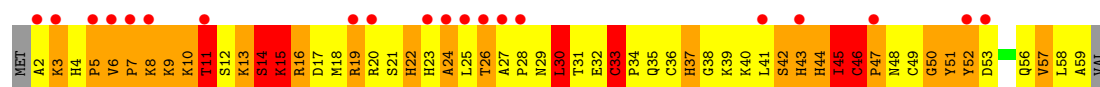
• Molecule 49: 50S ribosomal protein L27



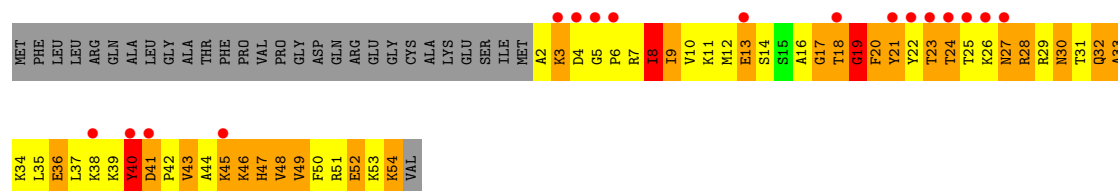
• Molecule 50: 50S ribosomal protein L31



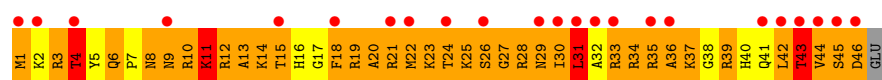
• Molecule 51: 50S ribosomal protein L32



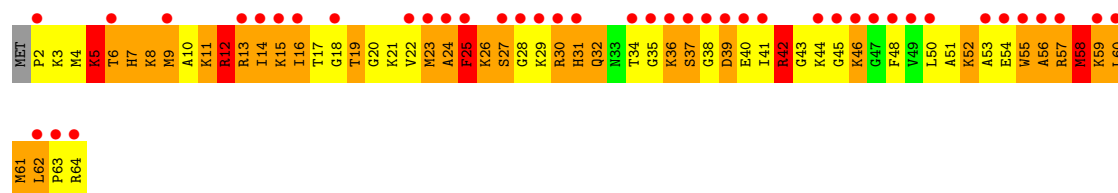
• Molecule 52: 50S ribosomal protein L33



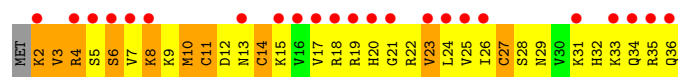
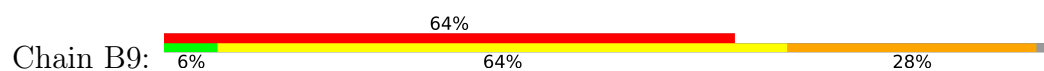
• Molecule 53: 50S ribosomal protein L34



• Molecule 54: 50S ribosomal protein L35

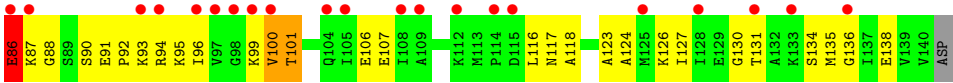


• Molecule 55: 50S ribosomal protein L36



• Molecule 56: 50S ribosomal protein L11





4 Data and refinement statistics

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 – 6.76	Depositor EDS
% Data completeness (in resolution range)	96.2 (43.35-6.76) 95.7 (43.35-6.76)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.19	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.11 (at 6.14Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.341 , 0.356 0.327 , 0.341	Depositor DCC
R_{free} test set	5643 reflections (4.78%)	wwPDB-VP
Wilson B-factor (Å ²)	233.6	Xtriage
Anisotropy	0.105	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.13 , 145.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.37$, $\langle L^2 \rangle = 0.20$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
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

Xtriage'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 ⓘ

5.1 Standard geometry ⓘ

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	1.08	60/36411 (0.2%)	1.15	252/56769 (0.4%)
2	AV	1.31	5/1814 (0.3%)	0.97	11/2827 (0.4%)
3	AW	1.14	9/1737 (0.5%)	1.32	22/2690 (0.8%)
4	AX	0.39	0/139	0.49	0/213
5	AB	0.97	2/1935 (0.1%)	0.91	2/2609 (0.1%)
6	AC	0.66	2/1636 (0.1%)	1.68	8/2205 (0.4%)
7	AD	1.04	3/1733 (0.2%)	1.38	14/2318 (0.6%)
8	AE	1.47	1/1162 (0.1%)	0.94	3/1564 (0.2%)
9	AF	0.47	0/856	0.82	0/1154
10	AG	0.47	0/1276	1.12	6/1709 (0.4%)
11	AH	0.60	0/1136	0.90	1/1527 (0.1%)
12	AI	0.47	0/1029	0.82	1/1378 (0.1%)
13	AJ	0.53	0/807	0.83	1/1085 (0.1%)
14	AK	0.66	1/900 (0.1%)	0.86	2/1213 (0.2%)
15	AL	1.90	1/986 (0.1%)	1.02	8/1320 (0.6%)
16	AM	0.54	0/1006	0.83	0/1341
17	AN	0.56	0/501	0.88	0/664
18	AO	0.43	0/745	0.86	0/992
19	AP	0.56	0/716	0.84	2/963 (0.2%)
20	AQ	1.95	3/870 (0.3%)	2.38	10/1159 (0.9%)
21	AR	0.55	0/603	0.94	0/799
22	AS	0.49	0/661	0.79	0/890
23	AT	0.43	0/764	0.88	0/1006
24	AU	0.45	0/212	0.78	0/277
26	BB	0.63	2/2950 (0.1%)	1.02	10/4602 (0.2%)
27	BA	1.05	131/67834 (0.2%)	1.18	510/105806 (0.5%)
28	BD	0.55	1/1328 (0.1%)	1.00	12/1783 (0.7%)
29	BE	0.98	4/1540 (0.3%)	1.68	19/2078 (0.9%)
30	BF	1.13	3/1444 (0.2%)	1.16	14/1954 (0.7%)
31	BG	0.31	0/971	0.82	5/1304 (0.4%)
32	BH	0.58	1/1272 (0.1%)	0.88	7/1721 (0.4%)
33	BI	0.54	1/1156 (0.1%)	0.82	6/1544 (0.4%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
34	BN	0.41	0/927	0.83	5/1245 (0.4%)
35	BO	0.40	0/946	0.91	4/1269 (0.3%)
36	BP	2.63	3/643 (0.5%)	1.63	6/870 (0.7%)
37	BQ	0.43	1/1106 (0.1%)	0.80	3/1490 (0.2%)
38	BS	1.68	3/877 (0.3%)	1.09	5/1179 (0.4%)
39	BT	0.49	0/412	1.24	4/554 (0.7%)
40	BW	1.35	3/869 (0.3%)	1.60	10/1166 (0.9%)
41	BX	0.71	1/608 (0.2%)	1.49	4/820 (0.5%)
42	BY	0.32	0/887	1.25	4/1195 (0.3%)
43	BZ	0.43	1/1385 (0.1%)	0.71	1/1883 (0.1%)
44	BR	0.37	0/867	0.67	2/1162 (0.2%)
45	BU	0.81	1/994 (0.1%)	0.91	4/1323 (0.3%)
46	BV	1.11	1/796 (0.1%)	1.24	7/1058 (0.7%)
47	B2	0.49	0/497	1.24	3/668 (0.4%)
48	B3	0.38	0/482	0.77	2/646 (0.3%)
49	B0	0.56	1/649 (0.2%)	1.16	5/860 (0.6%)
50	B4	1.72	2/620 (0.3%)	1.04	3/831 (0.4%)
51	B5	0.47	0/469	1.47	7/629 (1.1%)
52	B6	0.40	0/438	0.77	3/583 (0.5%)
53	B7	0.47	0/387	0.78	0/509
54	B8	1.04	1/503 (0.2%)	1.29	8/657 (1.2%)
55	B9	0.44	0/286	0.92	1/375 (0.3%)
56	BK	1.45	1/1010 (0.1%)	1.03	6/1349 (0.4%)
All	All	1.02	249/154788 (0.2%)	1.16	1023/231785 (0.4%)

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 249 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	AA	1037	C	O3'-P	-65.75	0.62	1.61
1	AA	1255	G	O3'-P	-58.24	0.73	1.61
27	BA	2199	A	O3'-P	-56.88	0.75	1.61
15	AL	23	LYS	C-N	-55.97	0.70	1.33
20	AQ	22	LEU	C-N	-45.77	0.69	1.33

The worst 5 of 1023 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
27	BA	2199	A	O3'-P-O5'	-54.55	22.18	104.00
29	BE	49	THR	O-C-N	-45.60	68.88	121.32
6	AC	106	VAL	O-C-N	38.06	161.75	122.54
20	AQ	22	LEU	O-C-N	35.06	166.15	123.02
27	BA	712(A)	A	P-O3'-C3'	-35.01	67.69	120.20

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

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	2047	4
2	AV	1622	0	819	181	0
3	AW	1638	0	835	194	0
4	AX	136	0	63	22	0
5	AB	1900	0	1950	97	0
6	AC	1612	0	1676	113	0
7	AD	1703	0	1760	292	0
8	AE	1146	0	1206	60	0
9	AF	843	0	857	54	0
10	AG	1257	0	1295	100	0
11	AH	1116	0	1177	104	0
12	AI	1011	0	1040	91	0
13	AJ	794	0	840	106	0
14	AK	885	0	904	56	0
15	AL	970	0	1056	76	0
16	AM	997	0	1070	188	0
17	AN	492	0	529	99	0
18	AO	734	0	771	30	0
19	AP	700	0	720	80	0
20	AQ	857	0	928	53	0
21	AR	597	0	668	57	0
22	AS	647	0	672	218	0
23	AT	762	0	859	33	0
24	AU	208	0	221	74	0
25	AY	365	0	0	14	0
26	BB	2637	0	1338	187	1
27	BA	60599	0	30523	10788	127
28	BD	1308	0	1346	1092	0
29	BE	1507	0	1475	1151	4
30	BF	1430	0	1357	1088	0
31	BG	957	0	950	709	0
32	BH	1251	0	1291	767	0
33	BI	1145	0	1225	638	4
34	BN	917	0	896	781	0
35	BO	937	0	992	635	0
36	BP	639	0	606	498	0
37	BQ	1081	0	1047	952	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
38	BS	866	0	868	707	0
39	BT	406	0	359	172	0
40	BW	860	0	909	579	0
41	BX	602	0	559	458	0
42	BY	879	0	859	755	0
43	BZ	1360	0	1378	908	0
44	BR	855	0	904	574	0
45	BU	978	0	1001	901	0
46	BV	787	0	784	660	0
47	B2	494	0	504	399	0
48	B3	477	0	528	453	0
49	B0	641	0	658	532	0
50	B4	604	0	586	506	0
51	B5	457	0	456	293	0
52	B6	431	0	454	286	0
53	B7	383	0	411	400	0
54	B8	496	0	539	379	0
55	B9	285	0	312	153	0
56	BK	999	0	1065	122	0
All	All	142811	0	94560	28628	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 121.

The worst 5 of 28628 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	12
6	AC	204/239 (85%)	165 (81%)	23 (11%)	16 (8%)	1	10
7	AD	206/209 (99%)	156 (76%)	33 (16%)	17 (8%)	0	9
8	AE	148/162 (91%)	115 (78%)	29 (20%)	4 (3%)	4	25
9	AF	99/101 (98%)	85 (86%)	10 (10%)	4 (4%)	2	18
10	AG	153/156 (98%)	131 (86%)	18 (12%)	4 (3%)	4	25
11	AH	136/138 (99%)	101 (74%)	25 (18%)	10 (7%)	1	10
12	AI	125/128 (98%)	87 (70%)	30 (24%)	8 (6%)	1	12
13	AJ	96/105 (91%)	73 (76%)	14 (15%)	9 (9%)	0	8
14	AK	117/129 (91%)	88 (75%)	22 (19%)	7 (6%)	1	13
15	AL	122/135 (90%)	92 (75%)	13 (11%)	17 (14%)	0	3
16	AM	119/126 (94%)	95 (80%)	19 (16%)	5 (4%)	2	17
17	AN	58/61 (95%)	42 (72%)	12 (21%)	4 (7%)	1	11
18	AO	86/89 (97%)	76 (88%)	9 (10%)	1 (1%)	10	44
19	AP	81/88 (92%)	64 (79%)	10 (12%)	7 (9%)	0	9
20	AQ	102/105 (97%)	78 (76%)	18 (18%)	6 (6%)	1	13
21	AR	71/88 (81%)	54 (76%)	11 (16%)	6 (8%)	0	9
22	AS	78/93 (84%)	60 (77%)	15 (19%)	3 (4%)	2	19
23	AT	97/106 (92%)	79 (81%)	12 (12%)	6 (6%)	1	13

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
24	AU	22/27 (82%)	17 (77%)	3 (14%)	2 (9%)	0	8
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	16
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 ⓘ

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%)	176 (87%)	26 (13%)	4	15
6	AC	160/188 (85%)	143 (89%)	17 (11%)	6	21
7	AD	180/181 (99%)	162 (90%)	18 (10%)	7	24
8	AE	115/123 (94%)	89 (77%)	26 (23%)	1	6
9	AF	90/90 (100%)	82 (91%)	8 (9%)	9	28
10	AG	126/127 (99%)	116 (92%)	10 (8%)	11	32
11	AH	119/119 (100%)	93 (78%)	26 (22%)	1	6
12	AI	98/99 (99%)	89 (91%)	9 (9%)	8	27
13	AJ	88/92 (96%)	78 (89%)	10 (11%)	5	18
14	AK	90/99 (91%)	87 (97%)	3 (3%)	33	55
15	AL	104/111 (94%)	92 (88%)	12 (12%)	5	18
16	AM	100/101 (99%)	86 (86%)	14 (14%)	3	13
17	AN	49/50 (98%)	42 (86%)	7 (14%)	3	13
18	AO	79/80 (99%)	67 (85%)	12 (15%)	3	12
19	AP	72/74 (97%)	64 (89%)	8 (11%)	6	20
20	AQ	96/97 (99%)	83 (86%)	13 (14%)	4	14
21	AR	64/77 (83%)	55 (86%)	9 (14%)	3	13
22	AS	71/80 (89%)	64 (90%)	7 (10%)	7	24
23	AT	76/82 (93%)	66 (87%)	10 (13%)	4	15

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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%)	93 (69%)	42 (31%)	0	2
29	BE	156/284 (55%)	128 (82%)	28 (18%)	2	9
30	BF	152/193 (79%)	124 (82%)	28 (18%)	1	8
31	BG	102/147 (69%)	93 (91%)	9 (9%)	9	28
32	BH	137/147 (93%)	110 (80%)	27 (20%)	1	7
33	BI	119/119 (100%)	98 (82%)	21 (18%)	2	9
34	BN	95/121 (78%)	79 (83%)	16 (17%)	2	10
35	BO	101/101 (100%)	77 (76%)	24 (24%)	1	4
36	BP	67/126 (53%)	52 (78%)	15 (22%)	1	6
37	BQ	110/110 (100%)	83 (76%)	27 (24%)	1	4
38	BS	89/149 (60%)	72 (81%)	17 (19%)	1	8
39	BT	44/52 (85%)	32 (73%)	12 (27%)	0	3
40	BW	88/92 (96%)	73 (83%)	15 (17%)	2	10
41	BX	67/73 (92%)	45 (67%)	22 (33%)	0	2
42	BY	97/105 (92%)	79 (81%)	18 (19%)	1	8
43	BZ	151/203 (74%)	127 (84%)	24 (16%)	2	11
44	BR	89/101 (88%)	70 (79%)	19 (21%)	1	6
45	BU	96/97 (99%)	68 (71%)	28 (29%)	0	2
46	BV	79/79 (100%)	68 (86%)	11 (14%)	3	14
47	B2	51/56 (91%)	37 (72%)	14 (28%)	0	3
48	B3	52/52 (100%)	44 (85%)	8 (15%)	2	12
49	B0	64/67 (96%)	55 (86%)	9 (14%)	3	13
50	B4	66/66 (100%)	54 (82%)	12 (18%)	2	9
51	B5	51/53 (96%)	41 (80%)	10 (20%)	1	7
52	B6	46/69 (67%)	37 (80%)	9 (20%)	1	7
53	B7	39/40 (98%)	30 (77%)	9 (23%)	1	5
54	B8	50/51 (98%)	41 (82%)	9 (18%)	2	9
55	B9	34/35 (97%)	30 (88%)	4 (12%)	5	18
56	BK	108/113 (96%)	105 (97%)	3 (3%)	38	60
All	All	4533/5148 (88%)	3798 (84%)	735 (16%)	2	11

5 of 735 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
37	BQ	51	GLU
43	BZ	43	PHE
37	BQ	134	PHE
37	BQ	49	VAL
40	BW	90	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 141 such sidechains are listed below:

Mol	Chain	Res	Type
45	BU	52	ASN
45	BU	115	ASN
50	B4	2	GLN
19	AP	13	HIS
18	AO	50	HIS

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	AA	1508/1522 (99%)	541 (35%)	158 (10%)
2	AV	75/76 (98%)	17 (22%)	2 (2%)
26	BB	122/123 (99%)	44 (36%)	3 (2%)
27	BA	2807/2916 (96%)	1520 (54%)	359 (12%)
3	AW	72/76 (94%)	14 (19%)	4 (5%)
4	AX	5/18 (27%)	0	0
All	All	4589/4731 (96%)	2136 (46%)	526 (11%)

5 of 2136 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 526 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
27	BA	2492	U

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Mol	Chain	Res	Type
27	BA	2578	G
27	BA	2484	G
27	BA	2866	U
27	BA	270(B)	A

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

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	0.73	1 (5%)	21,30,33	0.72	0
3	YYG	AW	37	3	38,42,43	0.89	2 (5%)	45,62,65	2.33	10 (22%)
3	PSU	AW	55	3	18,21,22	0.72	0	21,30,33	0.91	1 (4%)

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	1/1/8/9	7/24/42/43	0/4/4/4
3	PSU	AW	55	3	-	0/7/25/26	0/2/2/2

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	AW	37	YYG	C2-N2	3.09	1.38	1.33
3	AW	37	YYG	C3-N3	2.23	1.50	1.47
3	AW	39	PSU	C6-N1	-2.01	1.33	1.36

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	AW	37	YYG	C11-C12-N1	8.63	111.39	105.31
3	AW	37	YYG	C24-O23-C21	6.49	123.15	115.63
3	AW	37	YYG	C5-C4-N3	4.92	127.99	123.99
3	AW	37	YYG	O23-C21-N20	4.57	118.46	110.77
3	AW	37	YYG	C10-C11-N2	3.61	126.57	119.32

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	C15-C16-O18-C19
3	AW	37	YYG	O17-C16-O18-C19
3	AW	37	YYG	C12-C13-C14-C15
3	AW	37	YYG	C13-C14-C15-C16
3	AW	37	YYG	C13-C14-C15-N20

There are no ring outliers.

2 monomers are involved in 36 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	AW	39	PSU	2	0
3	AW	37	YYG	34	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides 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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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%)	0.72	162 (10%) 11 19	208, 348, 400, 400	0
2	AV	76/76 (100%)	1.18	15 (19%) 3 10	208, 360, 393, 393	0
3	AW	73/76 (96%)	1.24	11 (15%) 5 14	342, 400, 400, 400	0
4	AX	17/18 (94%)	6.46	14 (82%) 0 1	399, 399, 399, 399	0
5	AB	234/256 (91%)	1.12	43 (18%) 3 11	400, 400, 400, 400	0
6	AC	206/239 (86%)	1.55	60 (29%) 1 7	398, 400, 400, 400	0
7	AD	208/209 (99%)	2.25	91 (43%) 0 4	311, 385, 400, 400	0
8	AE	150/162 (92%)	1.32	39 (26%) 1 8	335, 400, 400, 400	0
9	AF	101/101 (100%)	1.64	29 (28%) 1 7	400, 400, 400, 400	0
10	AG	155/156 (99%)	1.62	45 (29%) 1 7	376, 395, 395, 395	0
11	AH	138/138 (100%)	1.33	31 (22%) 2 9	389, 389, 389, 389	0
12	AI	127/128 (99%)	1.92	50 (39%) 1 5	400, 400, 400, 400	0
13	AJ	98/105 (93%)	1.96	34 (34%) 1 6	399, 399, 399, 399	0
14	AK	119/129 (92%)	0.68	16 (13%) 7 15	250, 250, 400, 400	0
15	AL	124/135 (91%)	1.99	47 (37%) 1 5	383, 383, 397, 397	0
16	AM	125/126 (99%)	2.22	45 (36%) 1 5	400, 400, 400, 400	0
17	AN	60/61 (98%)	1.33	16 (26%) 1 8	398, 398, 398, 398	0
18	AO	88/89 (98%)	2.37	39 (44%) 0 4	392, 392, 392, 392	0
19	AP	83/88 (94%)	2.59	42 (50%) 0 3	394, 394, 394, 394	0
20	AQ	104/105 (99%)	1.71	40 (38%) 1 5	397, 397, 400, 400	0
21	AR	73/88 (82%)	1.56	20 (27%) 1 8	400, 400, 400, 400	0
22	AS	80/93 (86%)	2.14	30 (37%) 1 5	395, 395, 395, 395	0
23	AT	99/106 (93%)	2.62	52 (52%) 0 3	400, 400, 400, 400	0
24	AU	24/27 (88%)	2.91	15 (62%) 0 2	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%)	6.52	281 (76%) 0 1	340, 396, 400, 400	0
26	BB	123/123 (100%)	0.46	9 (7%) 21 27	242, 265, 342, 342	0
27	BA	2814/2916 (96%)	0.78	322 (11%) 10 18	67, 222, 387, 400	0
28	BD	173/173 (100%)	2.30	69 (39%) 1 5	398, 398, 400, 400	0
29	BE	191/338 (56%)	2.40	90 (47%) 0 4	388, 400, 400, 400	0
30	BF	189/246 (76%)	2.65	85 (44%) 0 4	398, 398, 399, 399	0
31	BG	122/176 (69%)	1.74	43 (35%) 1 6	400, 400, 400, 400	0
32	BH	164/177 (92%)	1.80	57 (34%) 1 6	399, 399, 400, 400	0
33	BI	148/149 (99%)	1.53	46 (31%) 1 7	400, 400, 400, 400	0
34	BN	117/145 (80%)	2.38	50 (42%) 0 4	388, 388, 388, 388	0
35	BO	122/122 (100%)	2.51	65 (53%) 0 3	400, 400, 400, 400	0
36	BP	84/164 (51%)	1.48	27 (32%) 1 6	400, 400, 400, 400	0
37	BQ	138/138 (100%)	2.74	65 (47%) 0 4	391, 391, 391, 391	0
38	BS	113/186 (60%)	1.70	32 (28%) 1 7	275, 370, 400, 400	0
39	BT	52/66 (78%)	2.69	30 (57%) 0 3	400, 400, 400, 400	0
40	BW	108/113 (95%)	1.53	32 (29%) 1 7	275, 277, 400, 400	0
41	BX	76/84 (90%)	1.94	26 (34%) 1 6	400, 400, 400, 400	0
42	BY	110/119 (92%)	2.65	47 (42%) 0 4	400, 400, 400, 400	0
43	BZ	177/253 (69%)	1.35	48 (27%) 1 8	376, 376, 379, 379	0
44	BR	105/118 (88%)	1.52	39 (37%) 1 5	345, 345, 345, 345	0
45	BU	117/118 (99%)	1.90	46 (39%) 1 5	356, 356, 392, 392	0
46	BV	100/100 (100%)	1.37	28 (28%) 1 8	385, 385, 400, 400	0
47	B2	64/70 (91%)	1.22	19 (29%) 1 7	287, 287, 287, 287	0
48	B3	60/60 (100%)	1.90	18 (30%) 1 7	343, 343, 343, 343	0
49	B0	86/91 (94%)	1.85	32 (37%) 1 5	400, 400, 400, 400	0
50	B4	73/73 (100%)	2.27	33 (45%) 0 4	400, 400, 400, 400	0
51	B5	58/60 (96%)	2.19	20 (34%) 1 6	400, 400, 400, 400	0
52	B6	53/82 (64%)	1.64	17 (32%) 1 6	400, 400, 400, 400	0
53	B7	46/47 (97%)	2.49	23 (50%) 0 3	400, 400, 400, 400	0
54	B8	63/64 (98%)	2.83	42 (66%) 0 2	400, 400, 400, 400	0
55	B9	35/36 (97%)	3.53	23 (65%) 0 2	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%)	2.03	48 (36%) 1 5	397, 400, 400, 400	0
All	All	10456/11346 (92%)	1.58	2798 (26%) 1 8	67, 388, 400, 400	0

The worst 5 of 2798 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
25	AY	243	ASN	30.0
4	AX	114	U	28.0
25	AY	304	PRO	27.2
25	AY	4	GLU	26.4
25	AY	338	ASP	24.4

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	0.44	0.23	400,400,400,400	0
3	PSU	AW	39	20/21	0.49	0.19	400,400,400,400	0
3	PSU	AW	55	20/21	0.51	0.11	400,400,400,400	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides 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.