wwPDB EM Validation Summary Report ⓘ

Jun 3, 2024 – 02:44 PM JST

PDB ID	:	7F0D
EMDB ID	:	EMD-31398
Title	:	Cryo-EM structure of Mycobacterium tuberculosis 50S ribosome subunit bound with clarithromycin
Authors	:	Zhang, W.; Sun, Y.; Gao, N.; Li, Z.
Deposited on	:	2021-06-03
Resolution	:	3.30 Å(reported)
Based on initial model	:	5V7Q

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

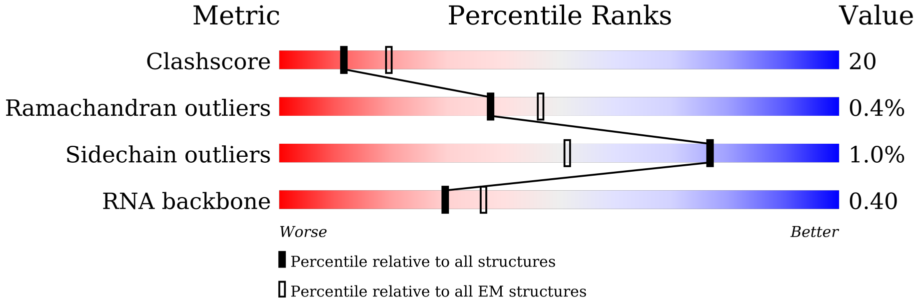
EMDB validation analysis	:	0.0.1.dev92
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance

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

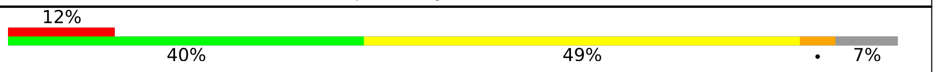
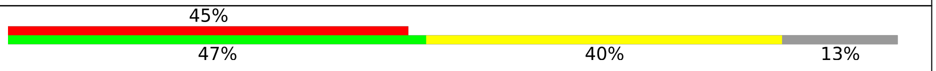
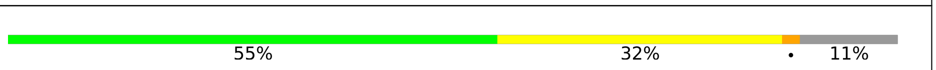
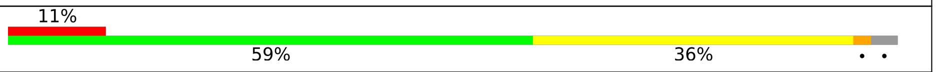
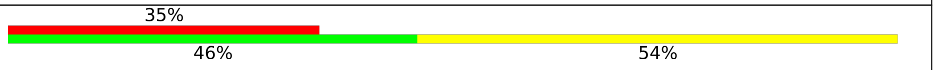
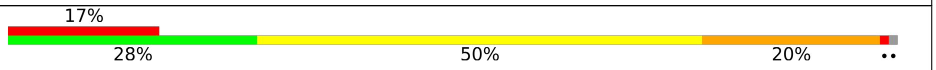
The reported resolution of this entry is 3.30 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	0	57	
2	1	55	
3	2	47	
4	3	64	
5	4	37	
6	6	80	
7	A	3138	

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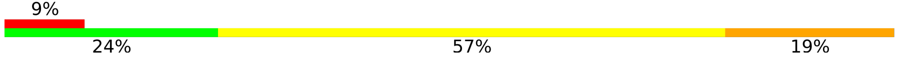
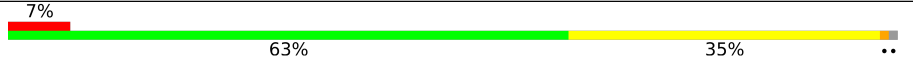
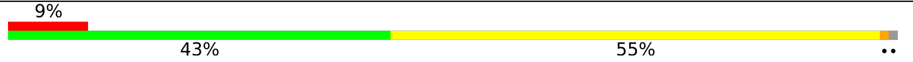
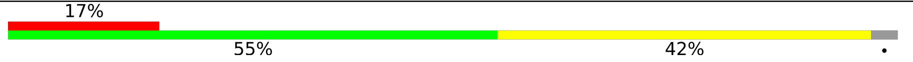
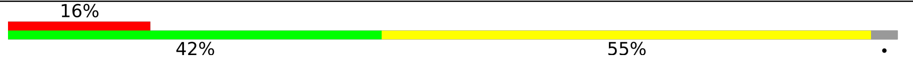
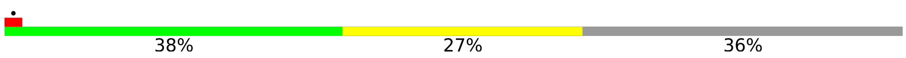
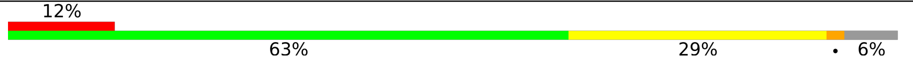
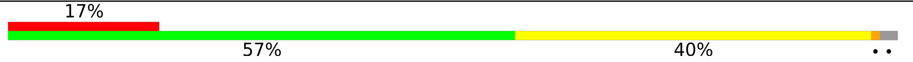
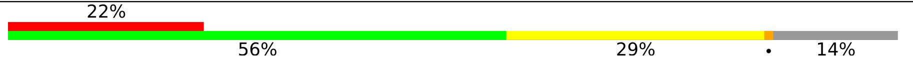
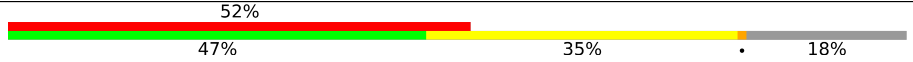
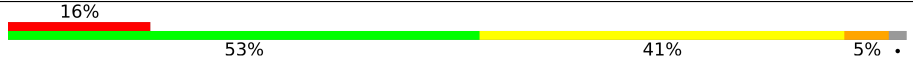
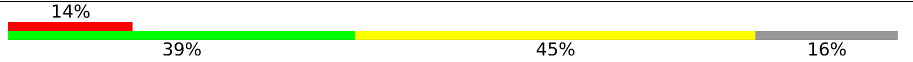
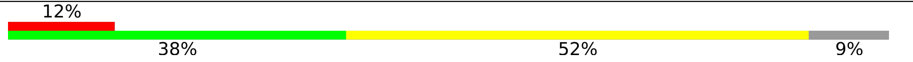
Mol	Chain	Length	Quality of chain
8	B	115	
9	C	280	
10	D	217	
11	E	223	
12	F	187	
13	G	179	
14	H	152	
15	J	147	
16	K	122	
17	L	146	
18	M	138	
19	N	180	
20	O	122	
21	P	113	
22	Q	129	
23	R	104	
24	S	197	
25	T	100	
26	U	105	
27	V	215	
28	W	86	
29	X	64	
30	Y	77	
31	Z	65	

2 Entry composition ⓘ

There are 34 unique types of molecules in this entry. The entry contains 94362 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
1	0	53	421	262	93	66	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	1	48	400	245	84	67	4	0	0

- Molecule 3 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	2	42	358	212	94	51	1	0	0

- Molecule 4 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	3	62	494	298	112	84	0	0

- Molecule 5 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	4	37	299	182	66	47	4	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
4	1	VAL	-	expression tag	UNP A0A3E0V5U0

- Molecule 6 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	6	45	345	214	60	66	5	0	0

- Molecule 7 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
7	A	3118	66978	29855	12345	21659	3119	1	0

- Molecule 8 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
8	B	115	2458	1097	456	790	115	0	0

- Molecule 9 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	C	272	2088	1277	437	369	5	0	0

- Molecule 10 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	D	213	1590	985	307	292	6	0	0

- Molecule 11 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	E	207	1552	958	303	289	2	0	0

- Molecule 12 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	F	170	1335	834	254	242	5	0	0

- Molecule 13 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	G	174	1330	836	249	244	1	0	0

- Molecule 14 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	H	47	350	220	64	65	1	0	0

- Molecule 15 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	J	146	1143	724	217	199	3	0	0

- Molecule 16 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	K	121	934	585	179	168	2	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
K	1	VAL	-	expression tag	UNP A0A045HTP7

- Molecule 17 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	L	142	1060	656	215	187	2	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L	1	VAL	-	expression tag	UNP A0A654TTE7

- Molecule 18 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	M	134	1072	679	215	177	1	0	0

- Molecule 19 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	N	116	908	574	175	158	1	0	0

- Molecule 20 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
20	O	116	886	541	188	157	0	0

- Molecule 21 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	P	112	907	573	174	159	1	0	0

- Molecule 22 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
22	Q	122	980	608	205	167	0	0

- Molecule 23 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
23	R	98	742	472	136	134	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
R	1	MET	-	initiating methionine	UNP P9WHC3

- Molecule 24 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
24	S	113	860	533	178	149	0	0

- Molecule 25 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
25	T	98	759	480	141	138	0	0

- Molecule 26 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	U	90	699	430	138	129	2	0	0

- Molecule 27 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
27	V	177	1319	822	243	254	0	0

- Molecule 28 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
28	W	74	546	336	111	99	0	0

- Molecule 29 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	X	63	476	289	101	81	5	0	0

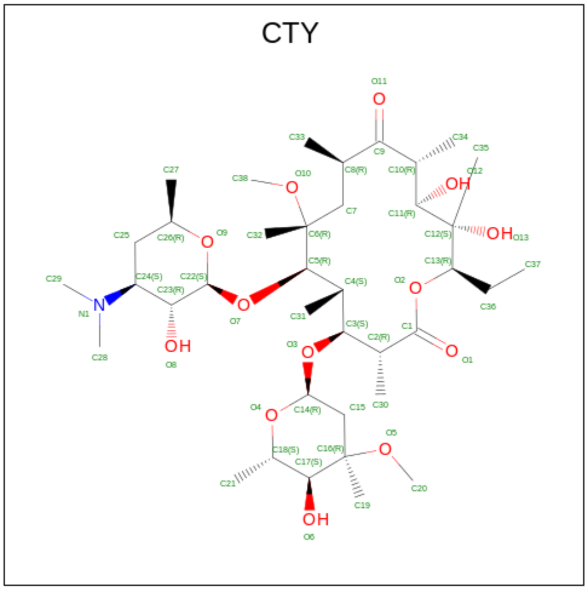
- Molecule 30 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	Y	65	541	331	106	103	1	0	0

- Molecule 31 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
31	Z	59	476	293	101	82	0	0

- Molecule 32 is CLARITHROMYCIN (three-letter code: CTY) (formula: $C_{38}H_{69}NO_{13}$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
32	A	1	52	38	1	13	0

- Molecule 33 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
33	A	1	1	1	0

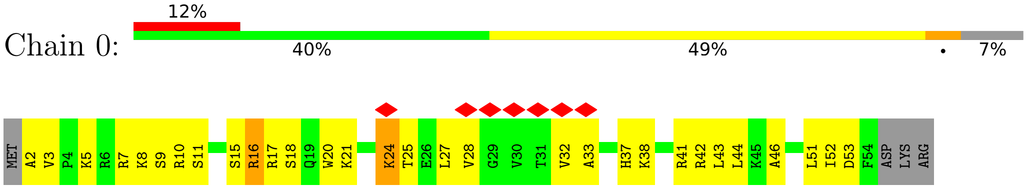
- Molecule 34 is water.

Mol	Chain	Residues	Atoms		AltConf
			Total	O	
34	A	3	3	3	0

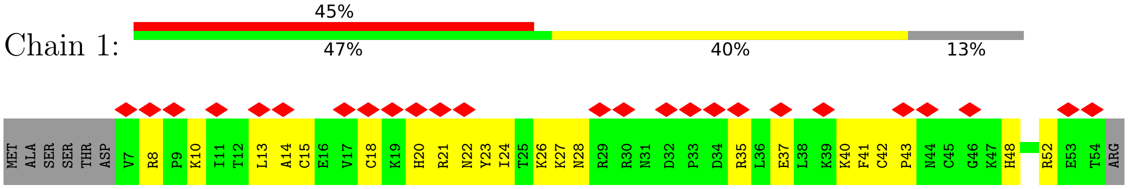
3 Residue-property plots

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

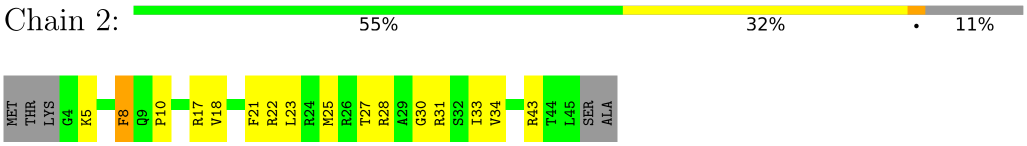
- Molecule 1: 50S ribosomal protein L32



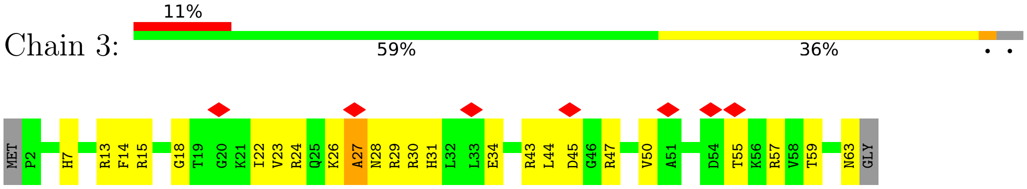
- Molecule 2: 50S ribosomal protein L33



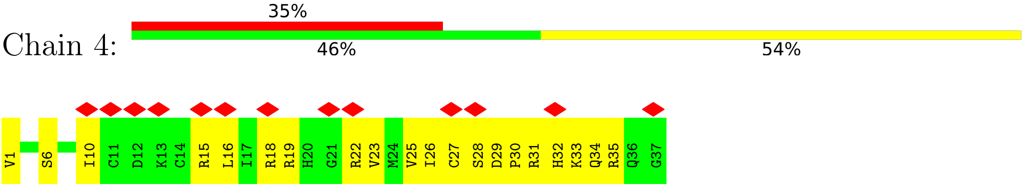
- Molecule 3: 50S ribosomal protein L34



- Molecule 4: 50S ribosomal protein L35

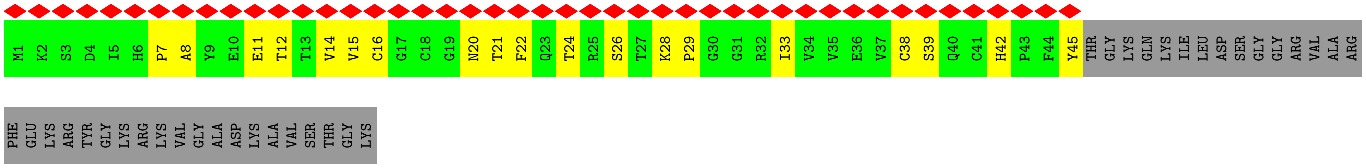


- Molecule 5: 50S ribosomal protein L36



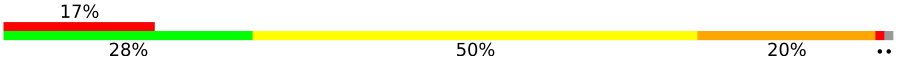
- Molecule 6: 50S ribosomal protein L31

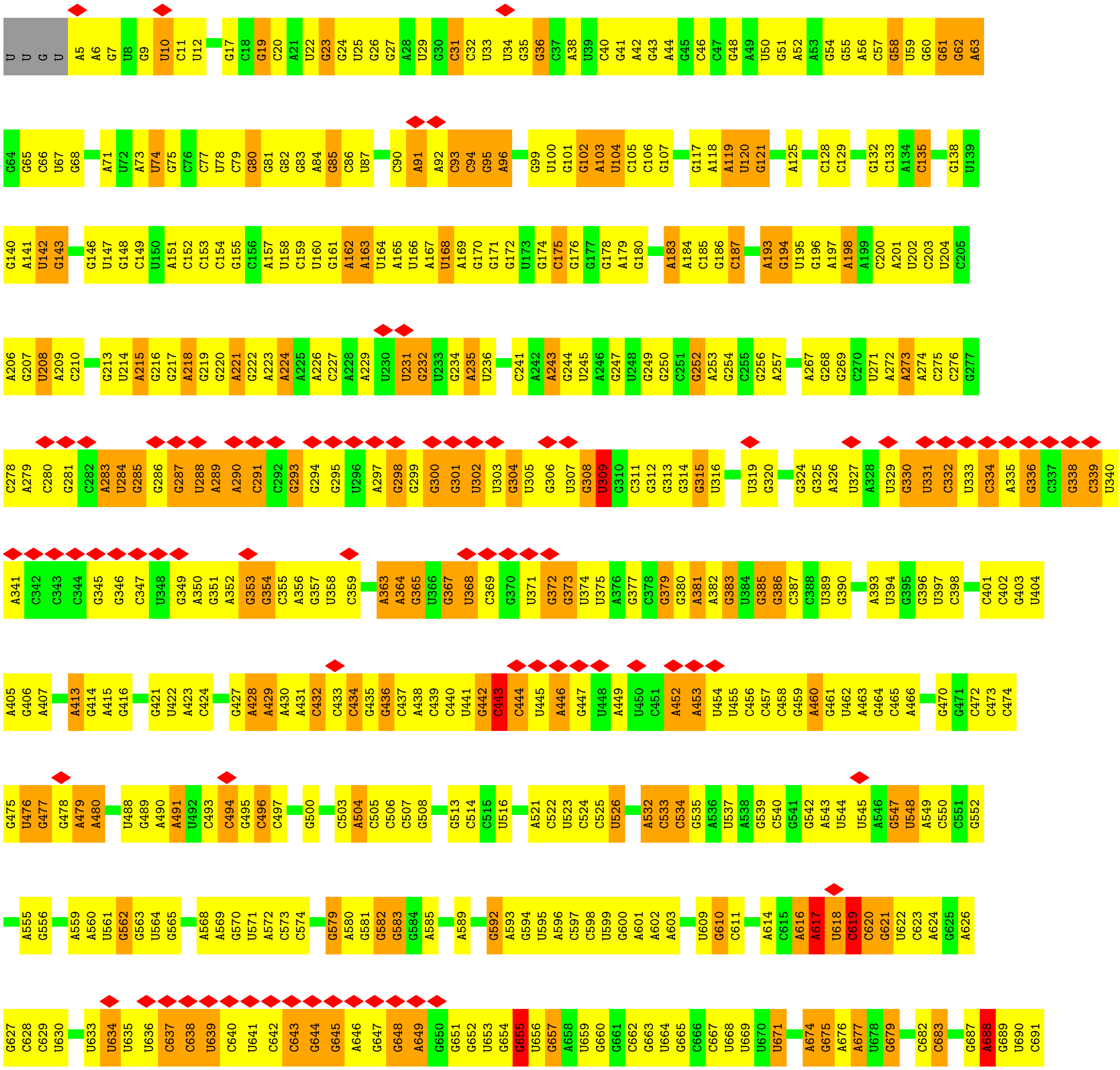
Chain 6:

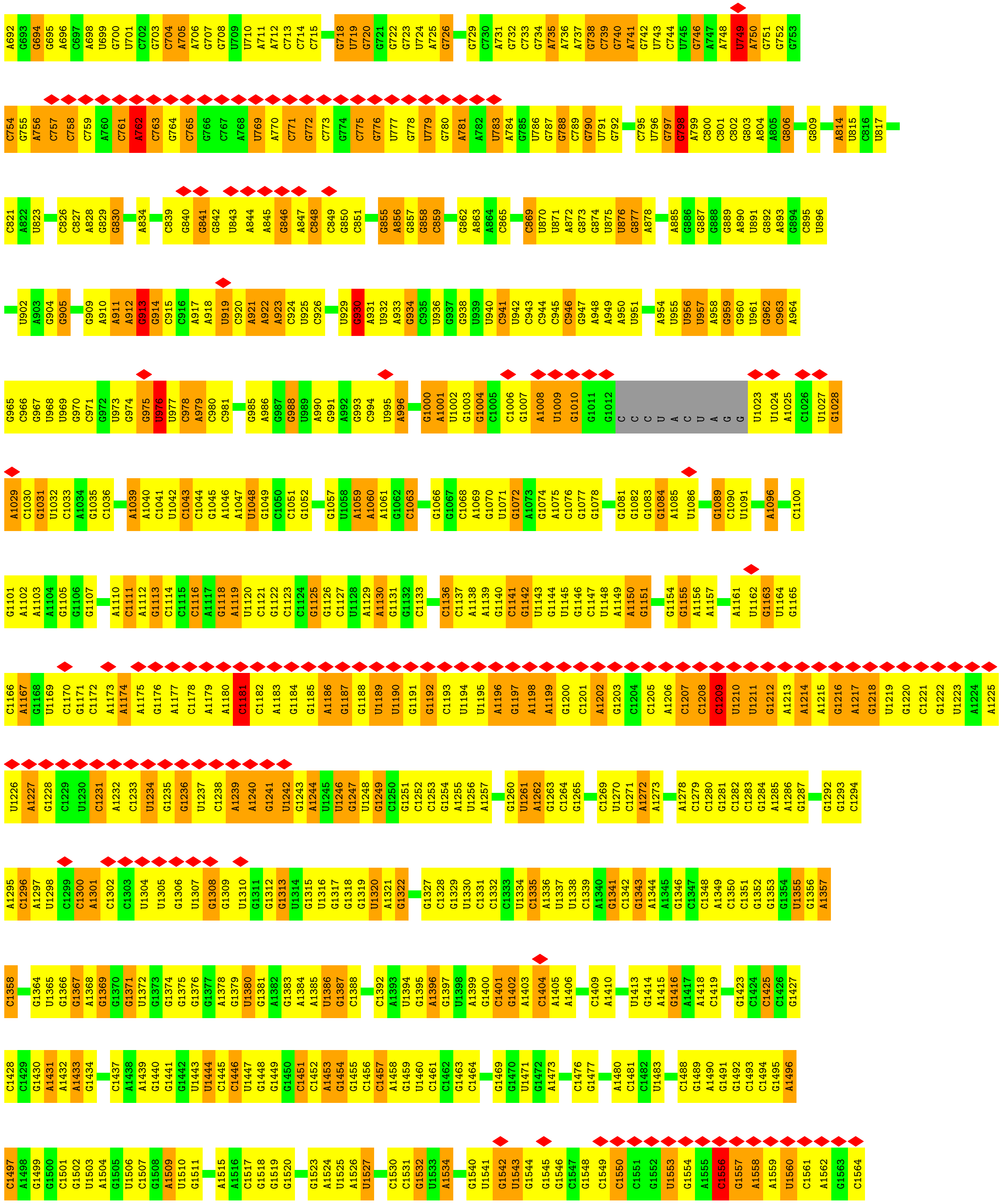


- Molecule 7: 23S rRNA

Chain A:



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C754 G755 A756 C757 G758 C759 A760 C761 A762 C763 G764 C765 G766 C767 A768 U769 A770 C771 G772 C773 G774 C775 G776 U777 G778 U779 G780 A781 A782 U783 A784 G785 U786 G787 G788 C789 G790 U791 G792 C795 U796 G797 G798 A799 C800 C801 C802 G803 A804 A805 G806 G809 A814 U815 C816 U817
C821 A822 U823 C826 C827 A828 G829 G830 A834 C839 G840 G841 G842 U843 A844 A845 G846 A847 C848 C849 G850 C851 G855 A856 G857 G858 C859 G862 A863 A864 C865 C869 U870 U871 A872 G873 G874 U875 U876 G877 A878 A885 G886 G887 G888 G889 A890 U891 G892 A893 G894 C895 U896
U902 A903 G904 G905 G909 A910 A911 A912 G913 G914 C915 G916 A917 A918 U919 C920 A921 A922 A923 C924 U925 C926 U929 C930 A931 U932 A933 G934 C935 U936 G937 G938 U939 U940 C941 U942 C943 C944 C945 C946 G947 A948 A949 A950 U951 A954 U955 U956 U957 A958 G959 G960 U961 G962 C963 A964
G965 C966 G967 U968 U969 G970 C971 G972 U973 G974 G975 U976 U977 C978 A979 C980 C981 G985 A986 G987 G988 U989 A990 G991 A992 G993 C994 U995 A996 G1000 A1001 U1002 G1003 G1004 C1005 C1006 G1007 A1008 U1009 G1010 G1011 G1012 C C C U A C U A G G U1023 U1024 A1025 C1026 U1027 G1028
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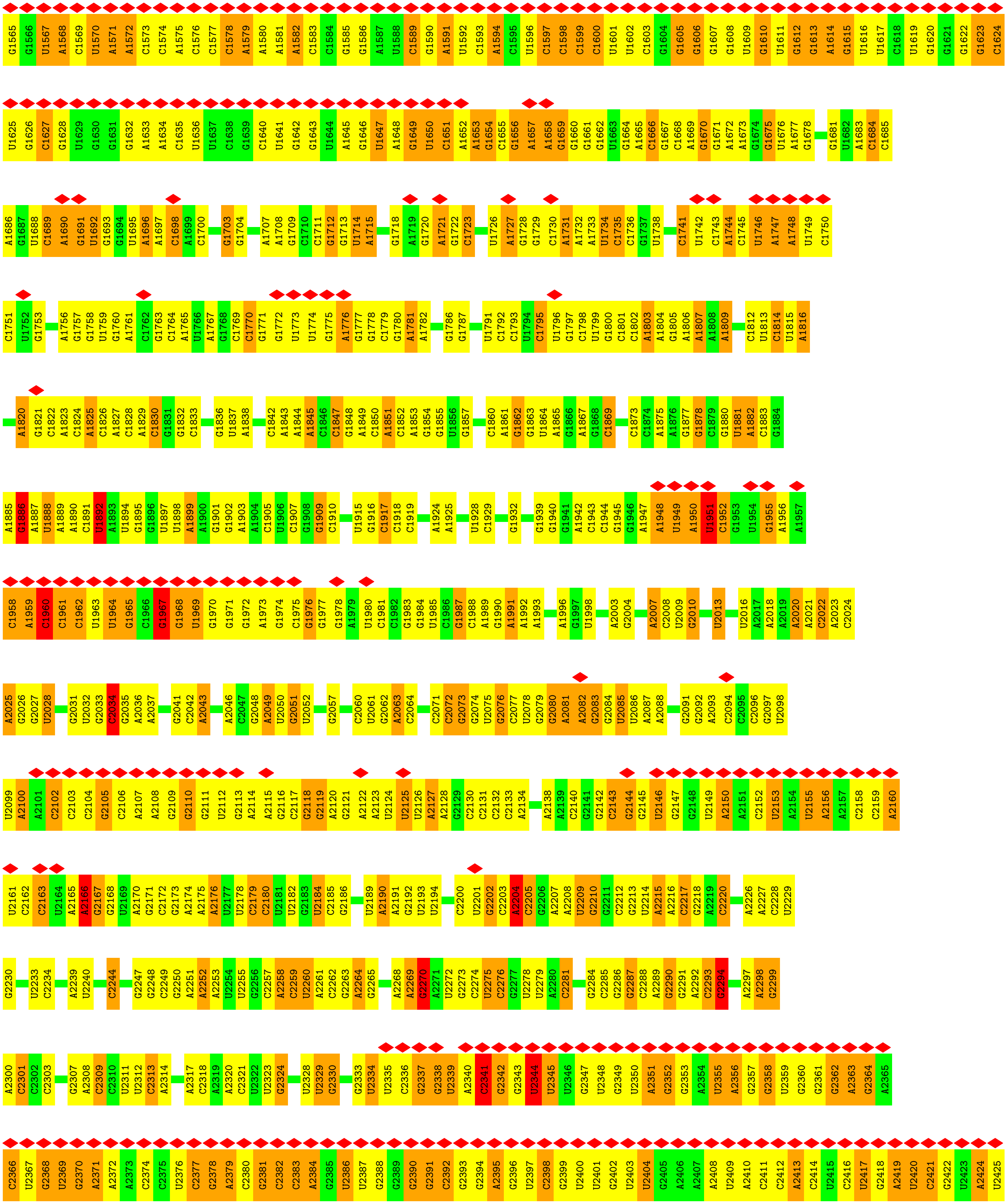
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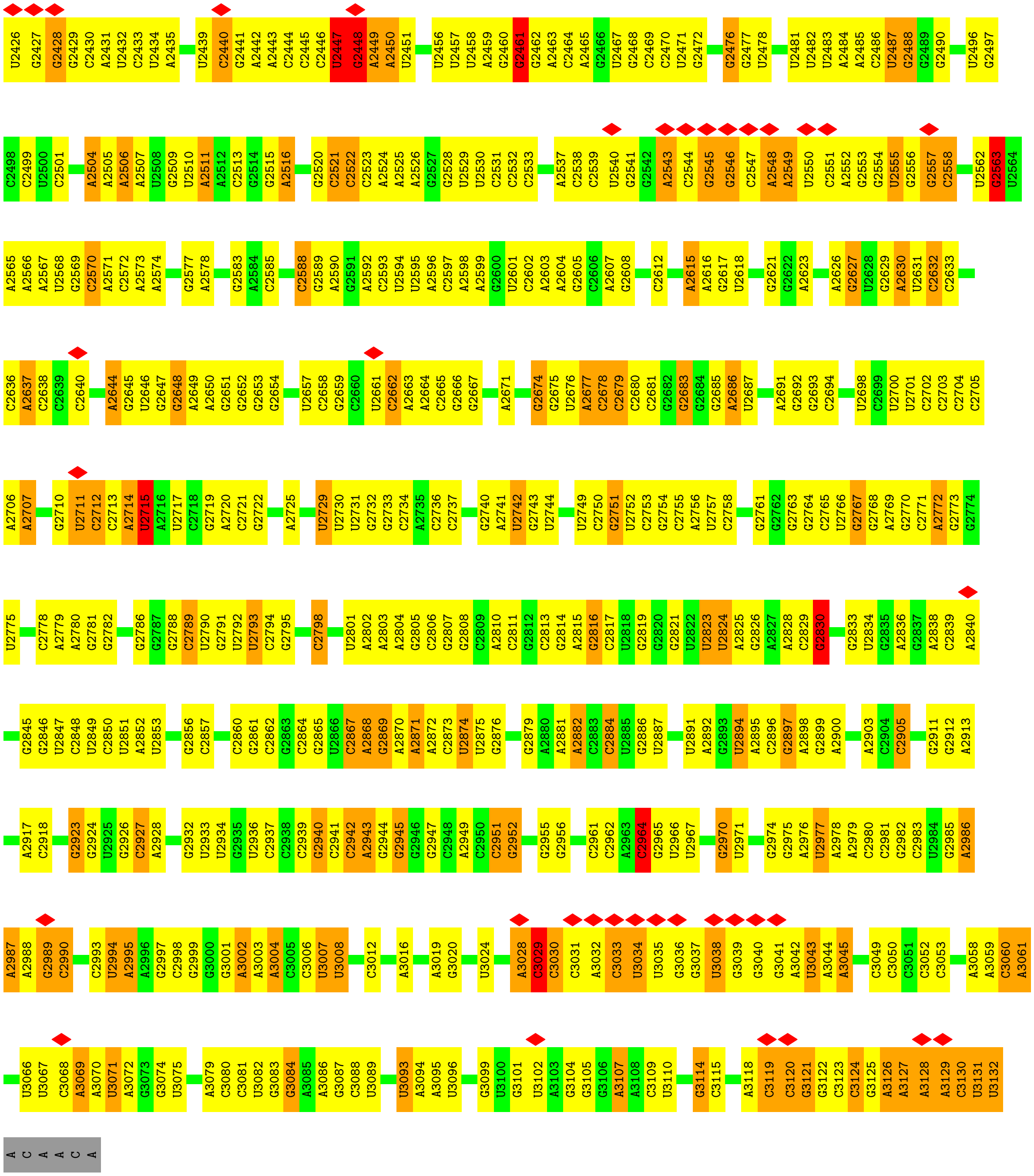
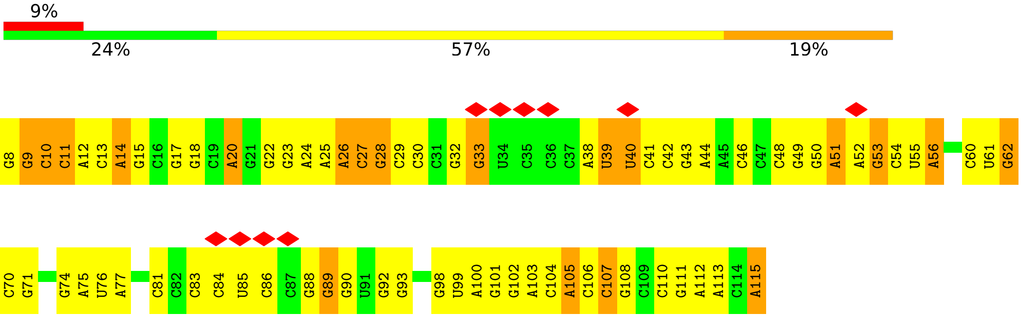


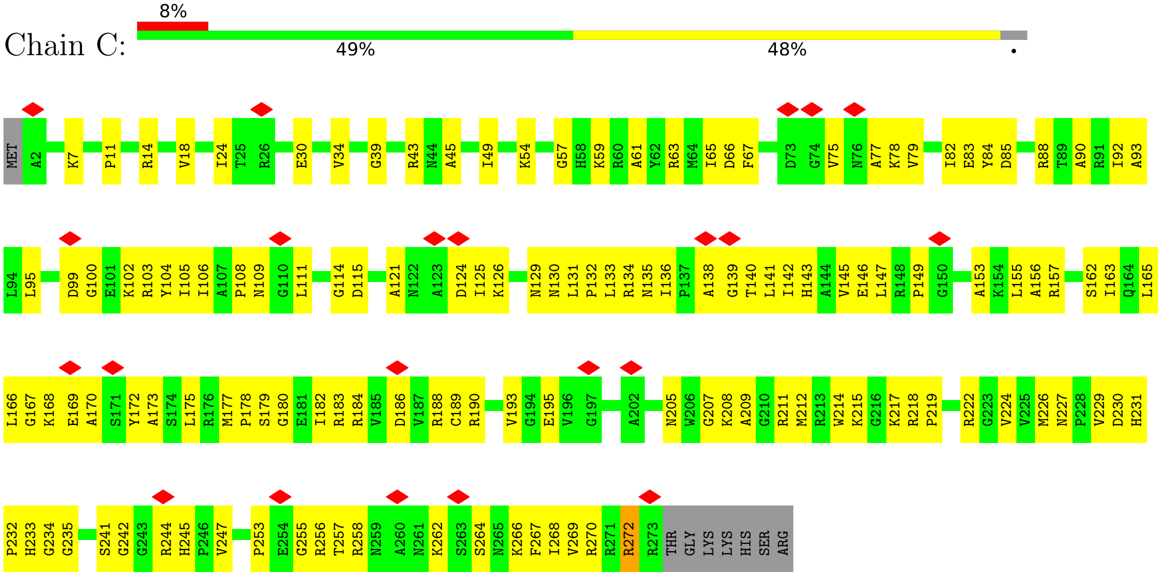
- Molecule 8: 5S ribosomal RNA

Chain B:



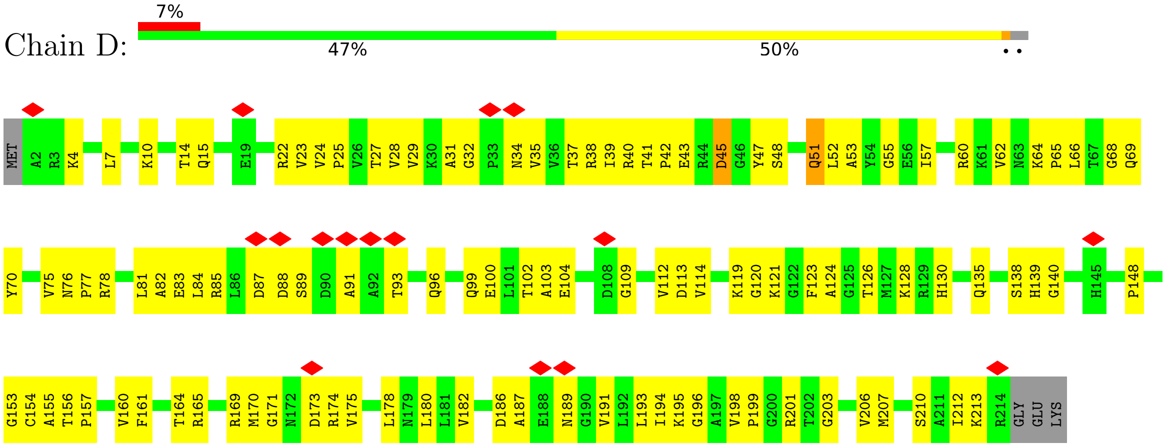
- Molecule 9: 50S ribosomal protein L2

Chain C:



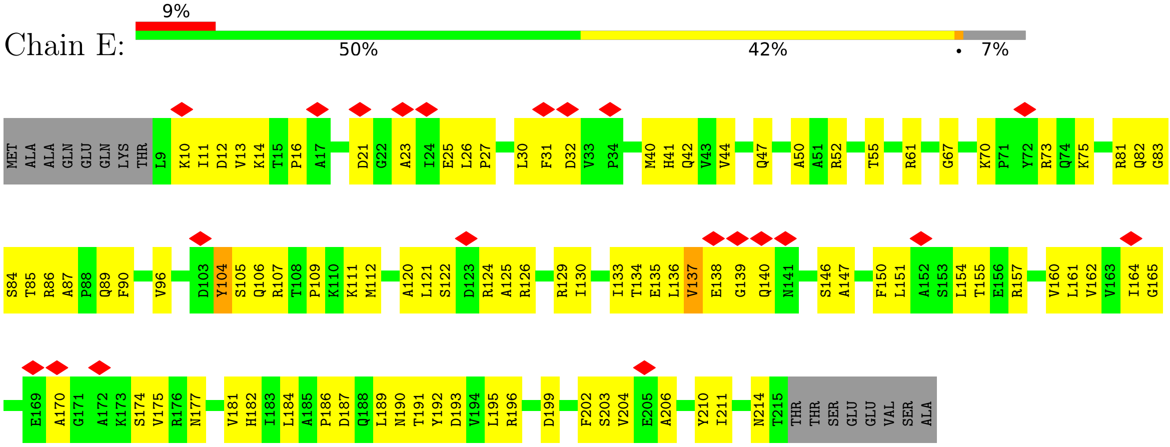
- Molecule 10: 50S ribosomal protein L3

Chain D:

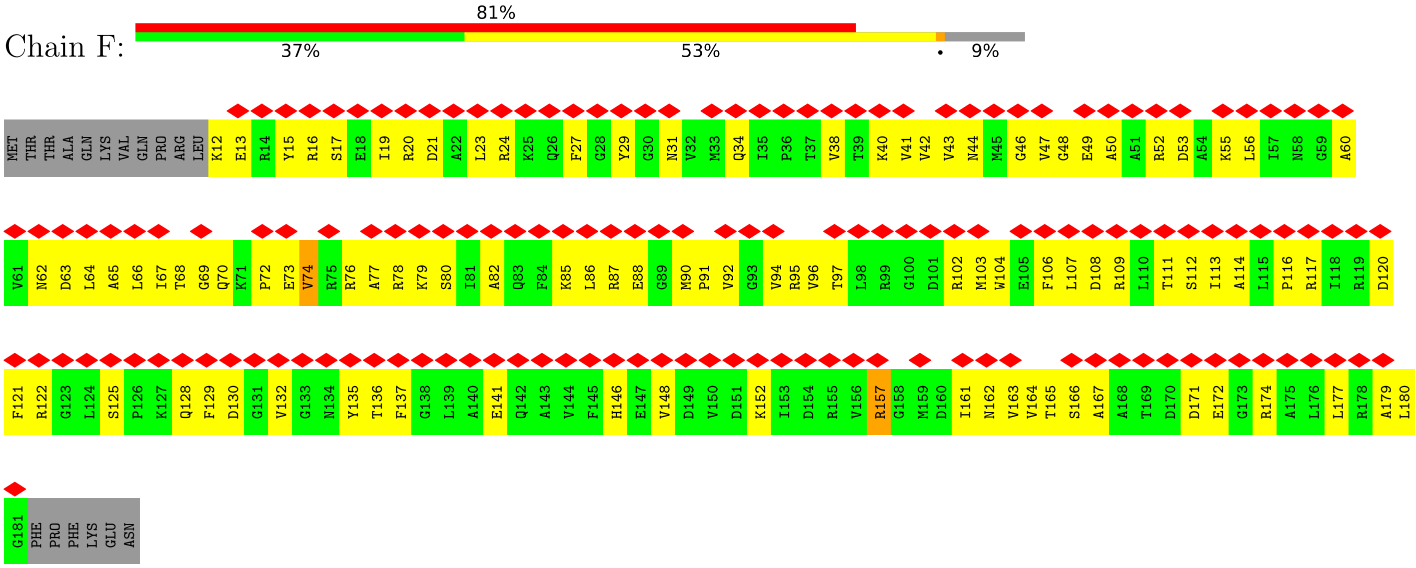


- Molecule 11: 50S ribosomal protein L4

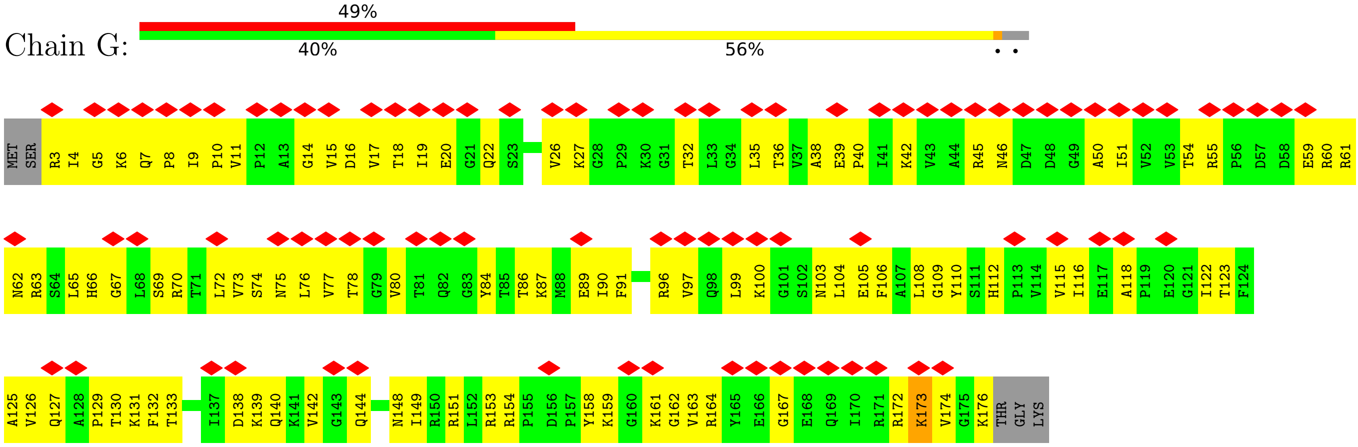
Chain E:



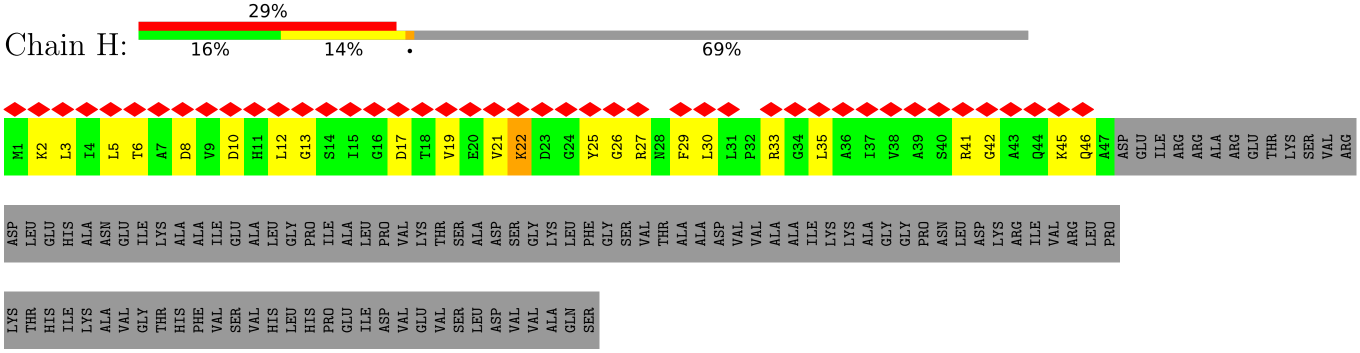
- Molecule 12: 50S ribosomal protein L5



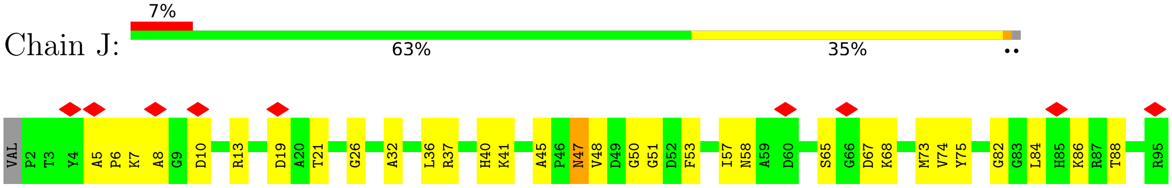
- Molecule 13: 50S ribosomal protein L6

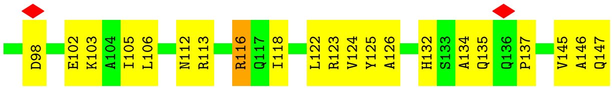


- Molecule 14: 50S ribosomal protein L9

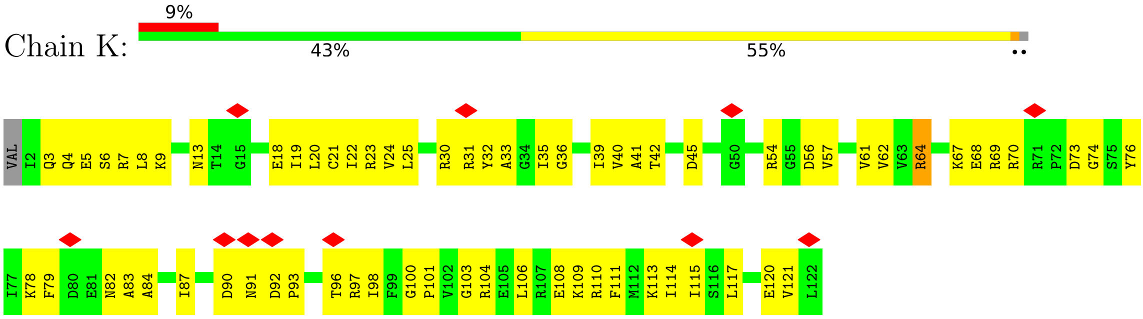


- Molecule 15: 50S ribosomal protein L13

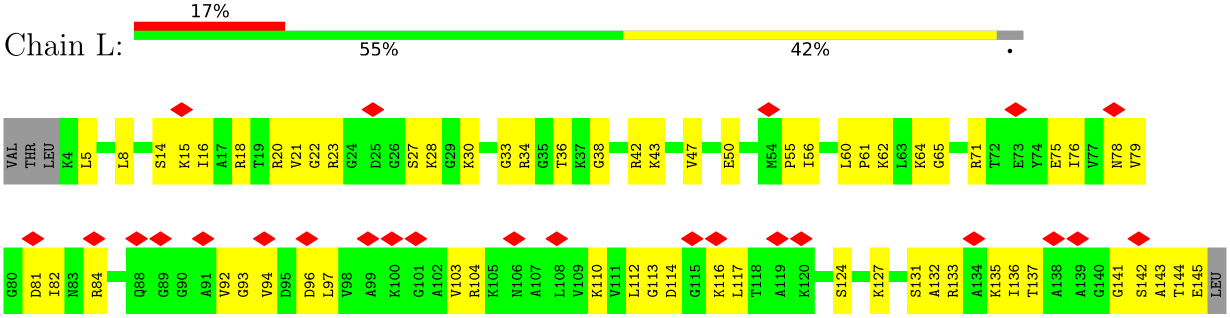




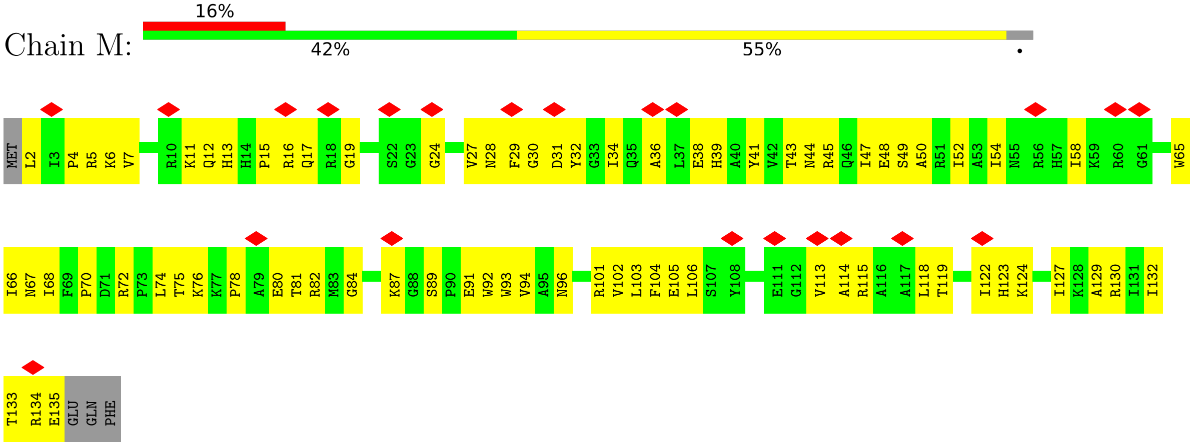
- Molecule 16: 50S ribosomal protein L14



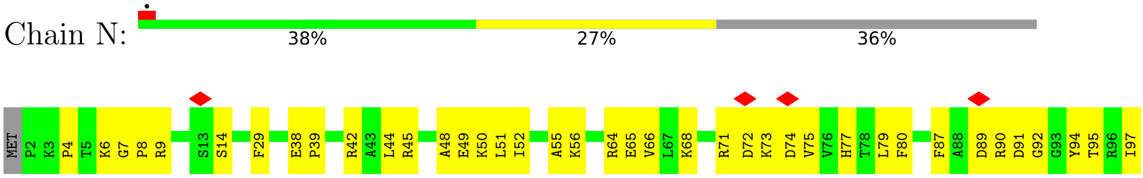
- Molecule 17: 50S ribosomal protein L15

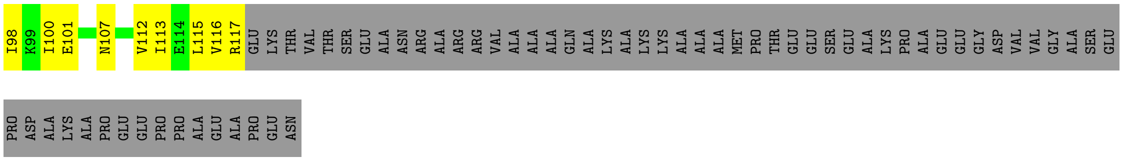


- Molecule 18: 50S ribosomal protein L16

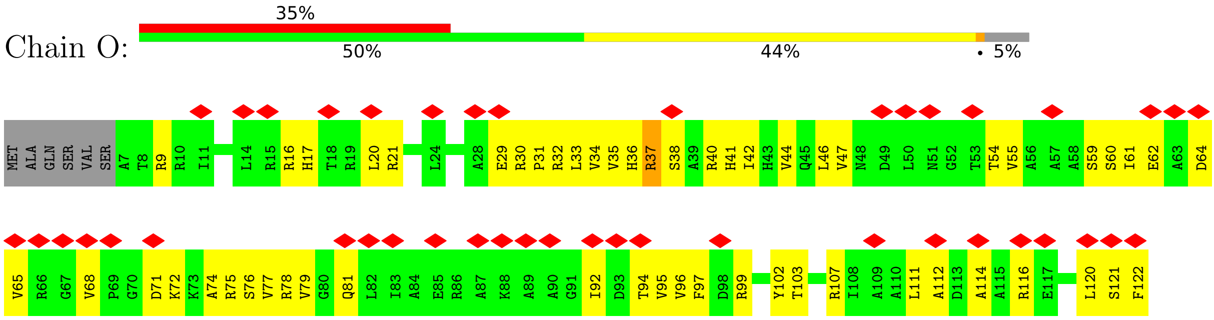


- Molecule 19: 50S ribosomal protein L17

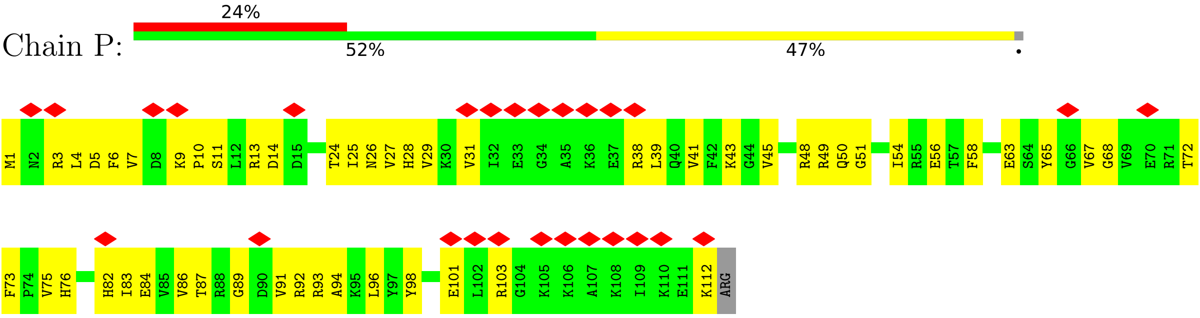




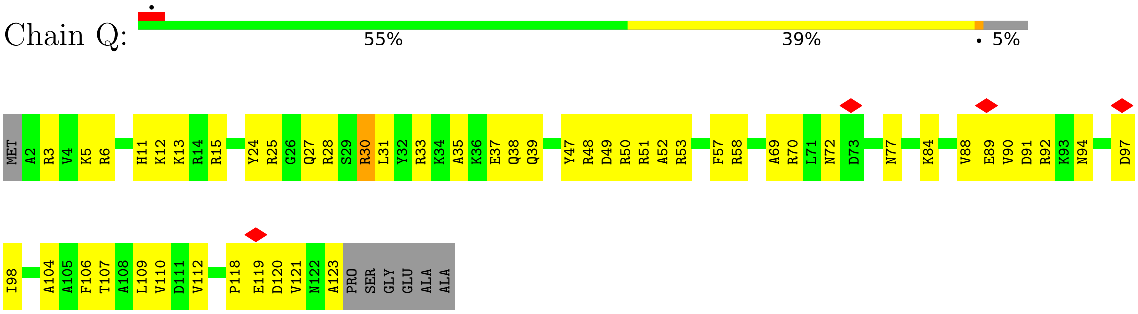
- Molecule 20: 50S ribosomal protein L18



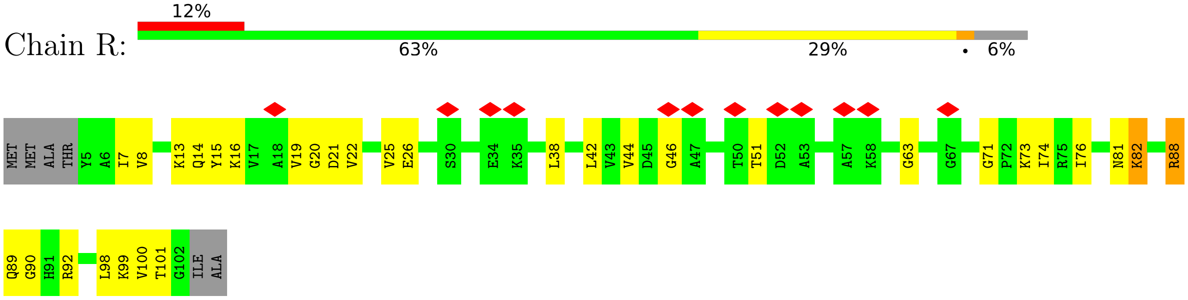
- Molecule 21: 50S ribosomal protein L19



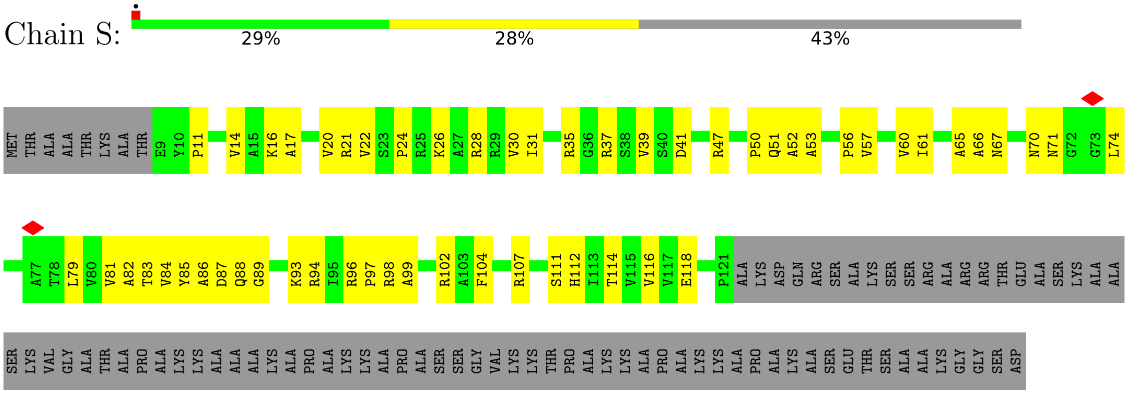
- Molecule 22: 50S ribosomal protein L20



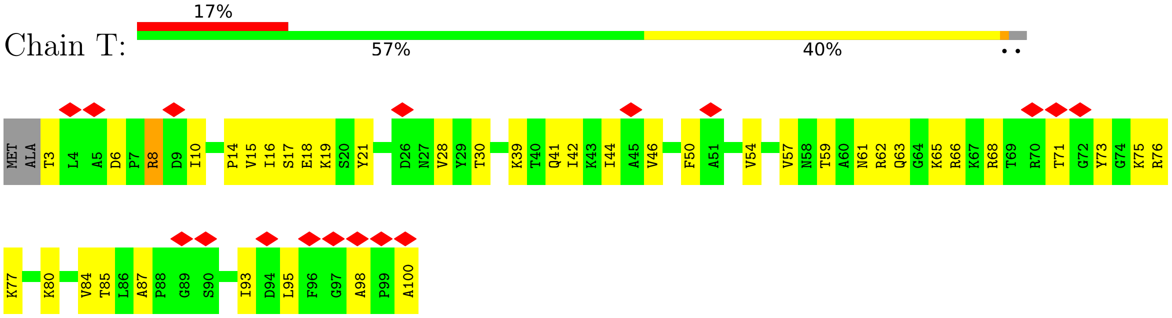
- Molecule 23: 50S ribosomal protein L21



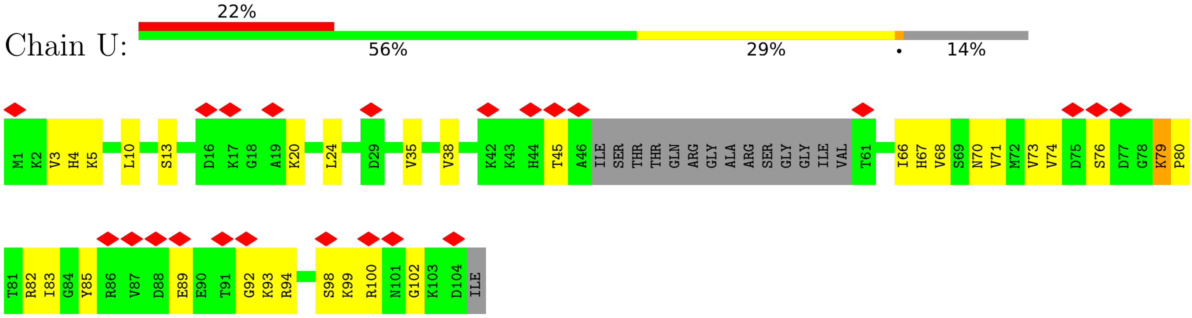
- Molecule 24: 50S ribosomal protein L22



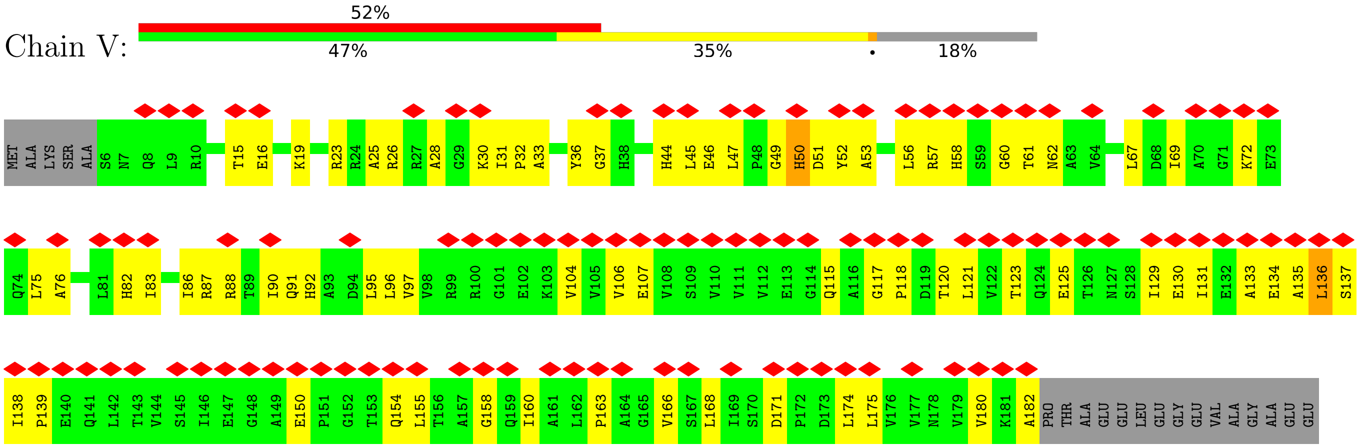
- Molecule 25: 50S ribosomal protein L23



- Molecule 26: 50S ribosomal protein L24

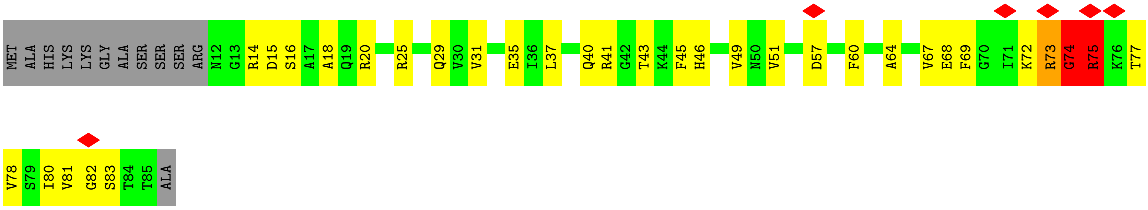


- Molecule 27: 50S ribosomal protein L25



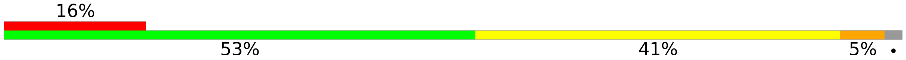
- Molecule 28: 50S ribosomal protein L27

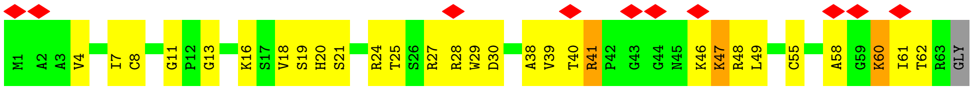
Chain W:



- Molecule 29: 50S ribosomal protein L28

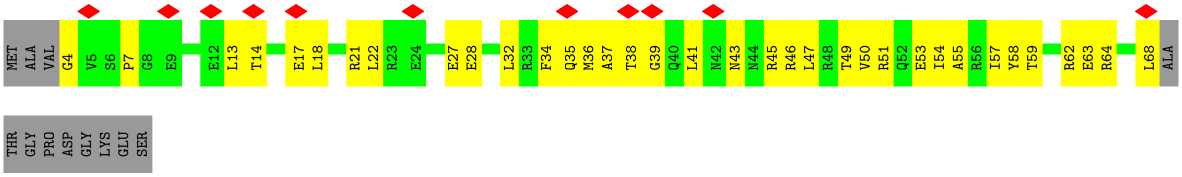
Chain X:





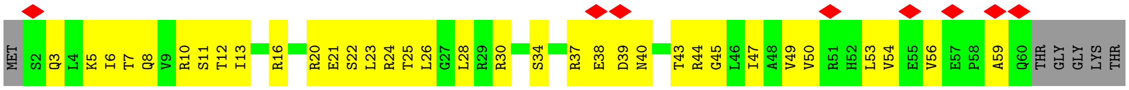
- Molecule 30: 50S ribosomal protein L29

Chain Y:



- Molecule 31: 50S ribosomal protein L30

Chain Z:



4 Experimental information ⓘ

Property	**Value**	**Source**
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	34912	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^{-}/\text{Å}^{2})$	50	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 IS (4k x 4k)	Depositor
Maximum map value	0.099	Depositor
Minimum map value	-0.061	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.015	Depositor
Map size (Å)	374.4, 374.4, 374.4	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.04, 1.04, 1.04	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| > 5$	RMSZ	$\#\|Z\| > 5$
1	0	0.57	0/427	0.65	0/570
2	1	0.41	0/407	0.59	0/543
3	2	0.53	0/361	0.63	0/473
4	3	0.48	0/499	0.60	0/664
5	4	0.40	0/303	0.55	0/402
6	6	0.30	0/353	0.55	0/478
7	A	1.07	12/74998 (0.0%)	1.13	220/117018 (0.2%)
8	B	0.78	0/2749	1.04	1/4284 (0.0%)
9	C	0.57	1/2129 (0.0%)	0.66	0/2861
10	D	0.58	0/1613	0.65	0/2174
11	E	0.49	0/1575	0.60	0/2129
12	F	0.32	0/1352	0.55	0/1817
13	G	0.39	0/1351	0.62	1/1824 (0.1%)
14	H	0.31	0/353	0.57	0/474
15	J	0.56	0/1170	0.60	0/1584
16	K	0.49	0/944	0.64	0/1268
17	L	0.50	0/1073	0.61	0/1432
18	M	0.51	0/1098	0.56	0/1481
19	N	0.55	0/925	0.58	0/1242
20	O	0.40	0/895	0.56	0/1202
21	P	0.55	0/922	0.57	0/1236
22	Q	0.67	0/992	0.60	0/1329
23	R	0.54	0/751	0.59	0/1009
24	S	0.56	0/874	0.58	0/1186
25	T	0.46	0/770	0.61	0/1038
26	U	0.44	0/705	0.58	0/941
27	V	0.36	0/1336	0.60	0/1820
28	W	0.55	0/551	0.66	0/735
29	X	0.54	0/484	0.61	0/648
30	Y	0.47	0/544	0.55	0/727
31	Z	0.50	0/480	0.63	0/645
All	All	0.95	13/102984 (0.0%)	1.04	222/155234 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	0	0	1
3	2	0	1
4	3	0	1
11	E	0	2
13	G	0	1
14	H	0	1
16	K	0	1
25	T	0	1
27	V	0	2
28	W	0	3
All	All	0	14

The worst 5 of 13 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	683	C	N1-C6	-5.82	1.33	1.37
7	A	1357	A	N9-C4	-5.69	1.34	1.37
7	A	2034	C	N1-C6	-5.63	1.33	1.37
7	A	688	A	N9-C4	-5.60	1.34	1.37
7	A	2166	A	N7-C5	-5.58	1.35	1.39

The worst 5 of 222 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	A	739	C	N3-C2-O2	-11.96	113.53	121.90
7	A	444	C	N3-C2-O2	-10.69	114.42	121.90
7	A	739	C	C6-N1-C2	-10.63	116.05	120.30
7	A	739	C	N1-C2-O2	10.52	125.21	118.90
7	A	444	C	C6-N1-C2	-9.70	116.42	120.30

There are no chirality outliers.

5 of 14 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	0	16	ARG	Peptide
3	2	43	ARG	Peptide
4	3	27	ALA	Peptide
11	E	11	ILE	Peptide

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Mol	Chain	Res	Type	Group
11	E	137	VAL	Peptide

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	0	421	0	461	35	0
2	1	400	0	413	27	0
3	2	358	0	390	15	0
4	3	494	0	533	28	0
5	4	299	0	326	18	0
6	6	345	0	332	14	0
7	A	66978	0	33731	1890	0
8	B	2458	0	1253	86	0
9	C	2088	0	2122	135	0
10	D	1590	0	1633	96	0
11	E	1552	0	1593	92	0
12	F	1335	0	1372	96	0
13	G	1330	0	1390	93	0
14	H	350	0	367	22	0
15	J	1143	0	1173	43	0
16	K	934	0	993	62	0
17	L	1060	0	1119	77	0
18	M	1072	0	1115	70	0
19	N	908	0	956	50	0
20	O	886	0	924	55	0
21	P	907	0	947	41	0
22	Q	980	0	1028	50	0
23	R	742	0	799	31	0
24	S	860	0	903	44	0
25	T	759	0	809	35	0
26	U	699	0	738	25	0
27	V	1319	0	1365	55	0
28	W	546	0	567	32	0
29	X	476	0	496	31	0
30	Y	541	0	551	28	0
31	Z	476	0	509	31	0
32	A	52	0	69	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
33	A	1	0	0	0	0
34	A	3	0	0	0	0
All	All	94362	0	60977	3003	0

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 20.

The worst 5 of 3003 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)
7:A:1222:G:H21	7:A:1227:A:N6	1.30	1.29
7:A:842:G:H21	7:A:847:A:N6	1.32	1.27
7:A:842:G:N2	7:A:847:A:H62	1.35	1.24
7:A:1222:G:N2	7:A:1227:A:H62	1.35	1.23
7:A:1185:G:N2	7:A:1232:A:H62	1.37	1.20

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	0	51/57 (90%)	38 (74%)	13 (26%)	0	100	100
2	1	46/55 (84%)	35 (76%)	11 (24%)	0	100	100
3	2	40/47 (85%)	32 (80%)	8 (20%)	0	100	100
4	3	60/64 (94%)	50 (83%)	10 (17%)	0	100	100
5	4	35/37 (95%)	27 (77%)	8 (23%)	0	100	100
6	6	43/80 (54%)	31 (72%)	12 (28%)	0	100	100
9	C	270/280 (96%)	207 (77%)	63 (23%)	0	100	100
10	D	211/217 (97%)	160 (76%)	51 (24%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
11	E	205/223 (92%)	166 (81%)	38 (18%)	1 (0%)	29	61
12	F	168/187 (90%)	133 (79%)	35 (21%)	0	100	100
13	G	172/179 (96%)	131 (76%)	41 (24%)	0	100	100
14	H	45/152 (30%)	37 (82%)	8 (18%)	0	100	100
15	J	144/147 (98%)	125 (87%)	19 (13%)	0	100	100
16	K	119/122 (98%)	93 (78%)	26 (22%)	0	100	100
17	L	140/146 (96%)	107 (76%)	33 (24%)	0	100	100
18	M	132/138 (96%)	109 (83%)	23 (17%)	0	100	100
19	N	114/180 (63%)	103 (90%)	11 (10%)	0	100	100
20	O	114/122 (93%)	93 (82%)	21 (18%)	0	100	100
21	P	110/113 (97%)	80 (73%)	30 (27%)	0	100	100
22	Q	120/129 (93%)	106 (88%)	12 (10%)	2 (2%)	9	35
23	R	96/104 (92%)	82 (85%)	12 (12%)	2 (2%)	7	31
24	S	111/197 (56%)	93 (84%)	18 (16%)	0	100	100
25	T	96/100 (96%)	81 (84%)	15 (16%)	0	100	100
26	U	86/105 (82%)	62 (72%)	24 (28%)	0	100	100
27	V	175/215 (81%)	124 (71%)	49 (28%)	2 (1%)	14	45
28	W	72/86 (84%)	51 (71%)	17 (24%)	4 (6%)	2	11
29	X	61/64 (95%)	43 (70%)	17 (28%)	1 (2%)	9	36
30	Y	63/77 (82%)	57 (90%)	6 (10%)	0	100	100
31	Z	57/65 (88%)	41 (72%)	16 (28%)	0	100	100
All	All	3156/3688 (86%)	2497 (79%)	647 (20%)	12 (0%)	38	66

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
28	W	73	ARG
28	W	74	GLY
22	Q	118	PRO
23	R	82	LYS
27	V	137	SER

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	0	43/47 (92%)	42 (98%)	1 (2%)	50	73
2	1	45/51 (88%)	45 (100%)	0	100	100
3	2	36/40 (90%)	35 (97%)	1 (3%)	43	70
4	3	53/54 (98%)	53 (100%)	0	100	100
5	4	35/35 (100%)	34 (97%)	1 (3%)	42	69
6	6	40/66 (61%)	40 (100%)	0	100	100
9	C	212/219 (97%)	210 (99%)	2 (1%)	78	87
10	D	163/166 (98%)	160 (98%)	3 (2%)	59	78
11	E	159/172 (92%)	157 (99%)	2 (1%)	69	82
12	F	139/155 (90%)	137 (99%)	2 (1%)	67	82
13	G	143/147 (97%)	142 (99%)	1 (1%)	84	90
14	H	36/121 (30%)	36 (100%)	0	100	100
15	J	120/121 (99%)	118 (98%)	2 (2%)	60	78
16	K	100/101 (99%)	99 (99%)	1 (1%)	76	86
17	L	106/110 (96%)	106 (100%)	0	100	100
18	M	110/114 (96%)	110 (100%)	0	100	100
19	N	94/139 (68%)	94 (100%)	0	100	100
20	O	88/93 (95%)	87 (99%)	1 (1%)	73	85
21	P	98/99 (99%)	98 (100%)	0	100	100
22	Q	95/99 (96%)	94 (99%)	1 (1%)	73	85
23	R	79/83 (95%)	78 (99%)	1 (1%)	69	82
24	S	87/140 (62%)	86 (99%)	1 (1%)	73	85
25	T	82/83 (99%)	81 (99%)	1 (1%)	71	83
26	U	77/88 (88%)	76 (99%)	1 (1%)	69	82
27	V	142/164 (87%)	142 (100%)	0	100	100
28	W	54/62 (87%)	53 (98%)	1 (2%)	57	77

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
29	X	52/52 (100%)	50 (96%)	2 (4%)	33	62
30	Y	58/66 (88%)	58 (100%)	0	100	100
31	Z	51/55 (93%)	51 (100%)	0	100	100
All	All	2597/2942 (88%)	2572 (99%)	25 (1%)	77	86

5 of 25 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
15	J	116	ARG
22	Q	30	ARG
29	X	60	LYS
20	O	37	ARG
23	R	88	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 49 such sidechains are listed below:

Mol	Chain	Res	Type
13	G	127	GLN
17	L	88	GLN
14	H	44	GLN
15	J	147	GLN
19	N	77	HIS

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
7	A	3115/3138 (99%)	965 (30%)	15 (0%)
8	B	114/115 (99%)	33 (28%)	1 (0%)
All	All	3229/3253 (99%)	998 (30%)	16 (0%)

5 of 998 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
7	A	10	U
7	A	12	U
7	A	17	G
7	A	19	G
7	A	23	G

5 of 16 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
7	A	2994	U
7	A	2338	G
7	A	1605	G
7	A	2179	C
7	A	1567	U

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 for Mogul analysis.

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	$\#\|Z\| > 2$
32	CTY	A	3201	-	54,54,54	2.07	18 (33%)	83,83,83	2.05	20 (24%)

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
32	CTY	A	3201	-	-	35/75/110/110	0/3/3/3

The worst 5 of 18 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
32	A	3201	CTY	O9-C26	5.55	1.55	1.44
32	A	3201	CTY	O2-C1	4.64	1.45	1.34
32	A	3201	CTY	O4-C18	4.57	1.55	1.44
32	A	3201	CTY	C25-C24	-3.98	1.45	1.53
32	A	3201	CTY	C21-C18	-3.93	1.42	1.51

The worst 5 of 20 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
32	A	3201	CTY	O5-C16-C17	7.37	114.73	103.81
32	A	3201	CTY	C19-C16-C15	-5.43	100.79	110.49
32	A	3201	CTY	C15-C16-C17	4.60	115.91	107.67
32	A	3201	CTY	C36-C13-C12	-4.28	107.08	115.20
32	A	3201	CTY	C6-C5-C4	-4.16	107.23	113.61

There are no chirality outliers.

5 of 35 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
32	A	3201	CTY	C9-C10-C11-C12
32	A	3201	CTY	C9-C10-C11-O12
32	A	3201	CTY	C34-C10-C11-C12
32	A	3201	CTY	C34-C10-C11-O12
32	A	3201	CTY	C10-C11-C12-C35

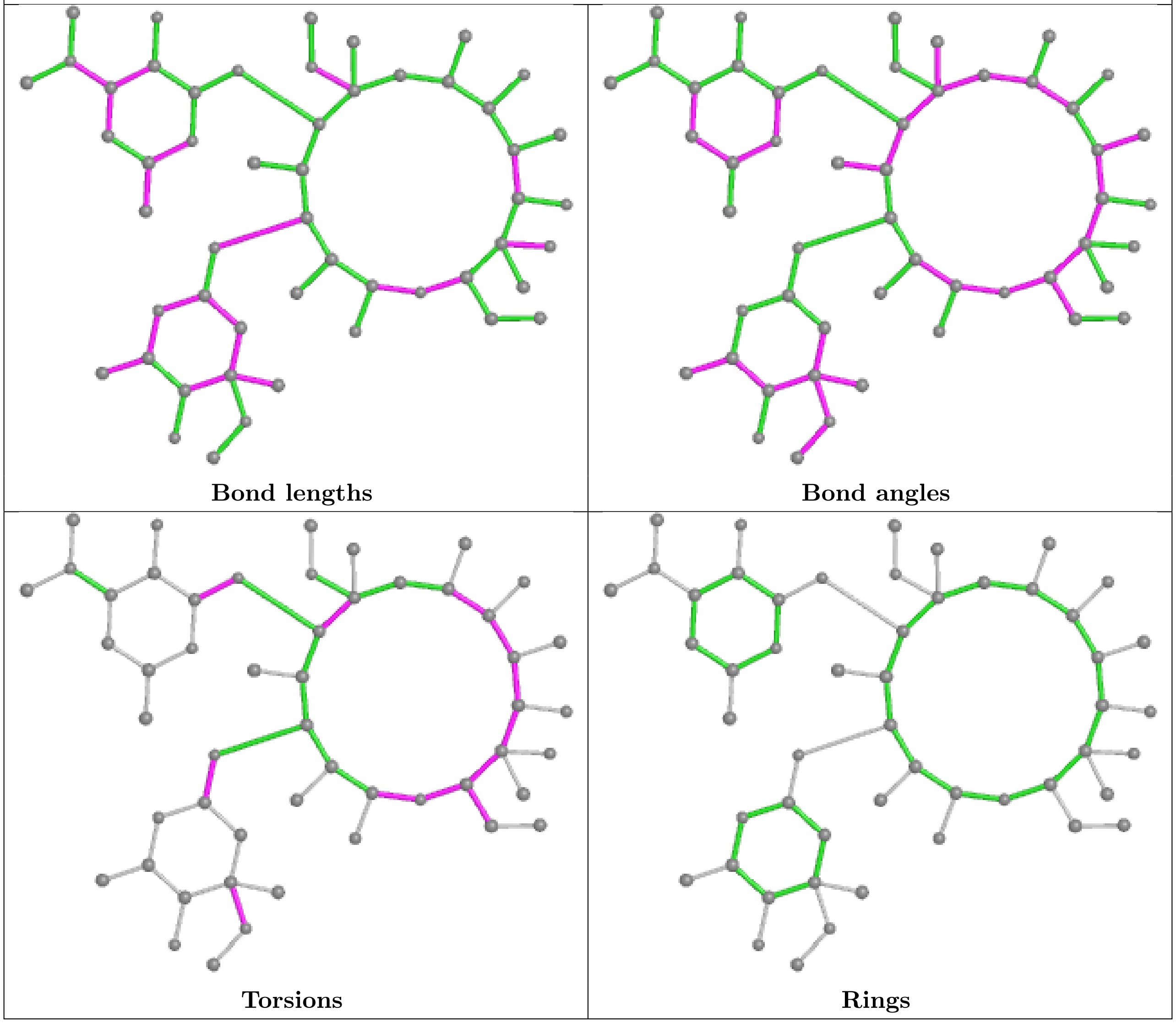
There are no ring outliers.

1 monomer is involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
32	A	3201	CTY	9	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand CTY A 3201



5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

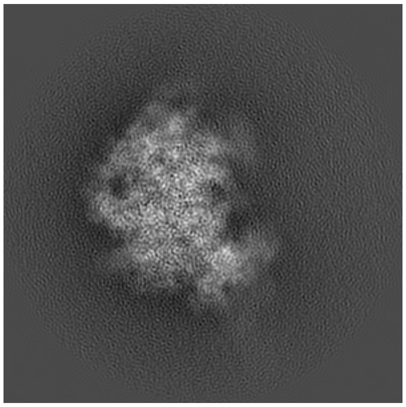
6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-31398. These allow visual inspection of the internal detail of the map and identification of artifacts.

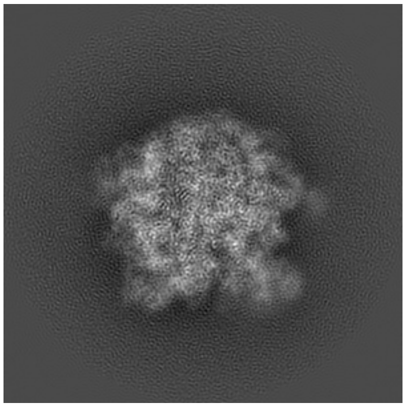
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections ⓘ

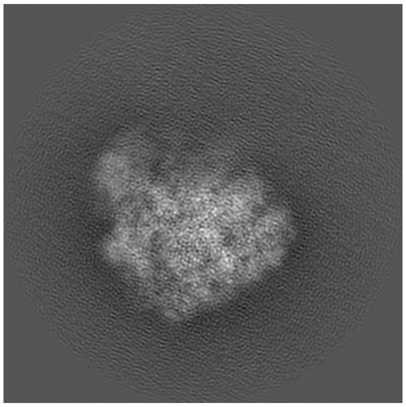
6.1.1 Primary map



X



Y

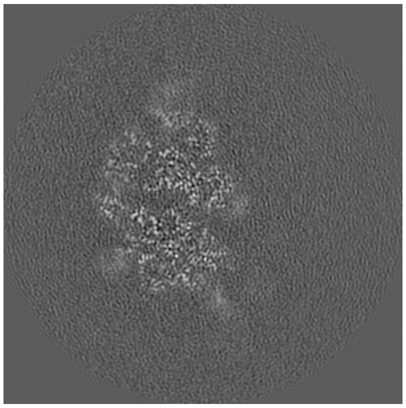


Z

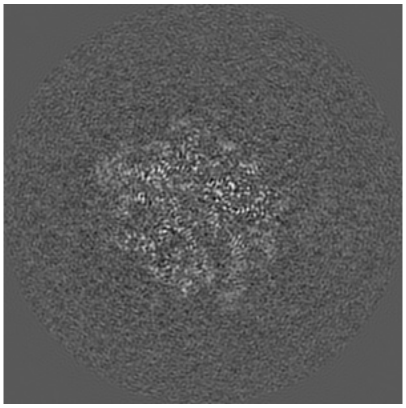
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ

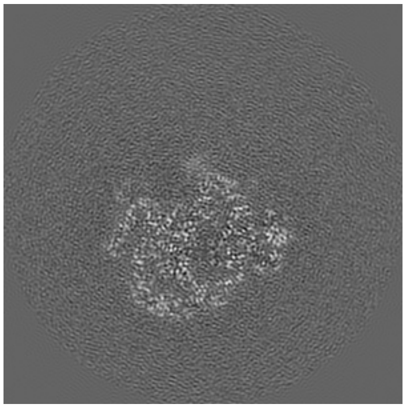
6.2.1 Primary map



X Index: 180



Y Index: 180

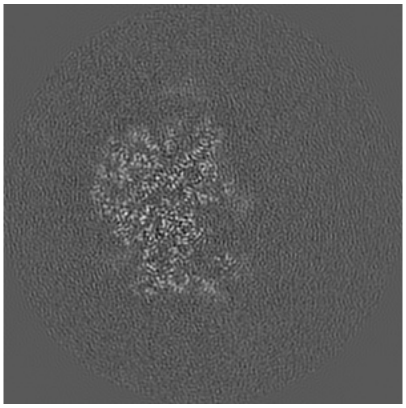


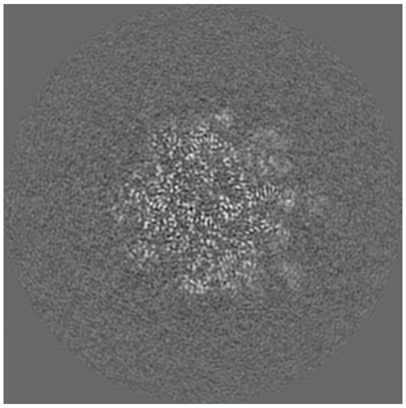
Z Index: 180

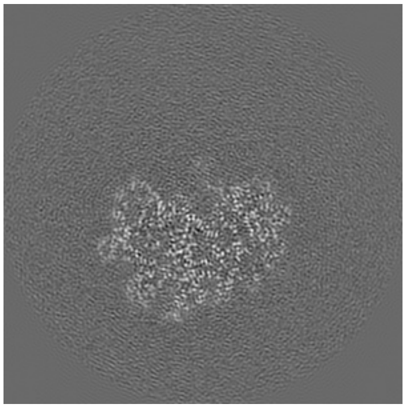
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices

6.3.1 Primary map


X Index: 172

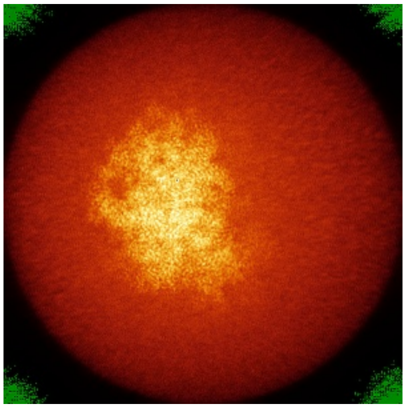

Y Index: 156

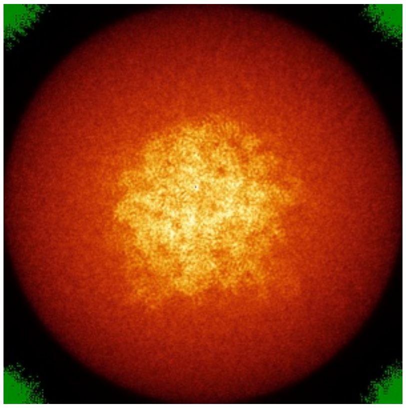

Z Index: 169

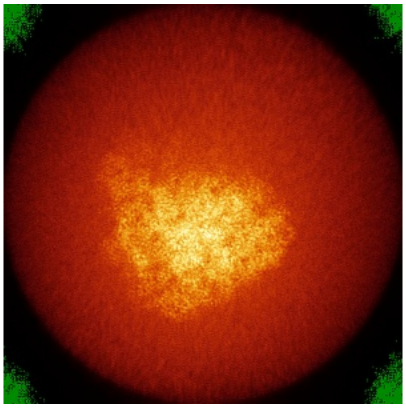
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color)

6.4.1 Primary map


X


Y

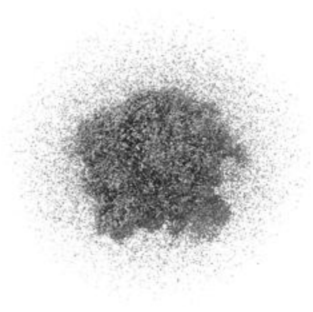

Z

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

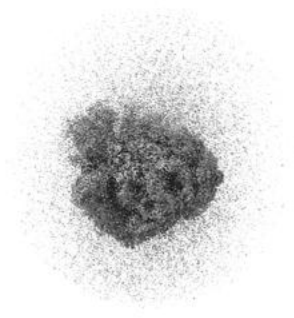
6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.015. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

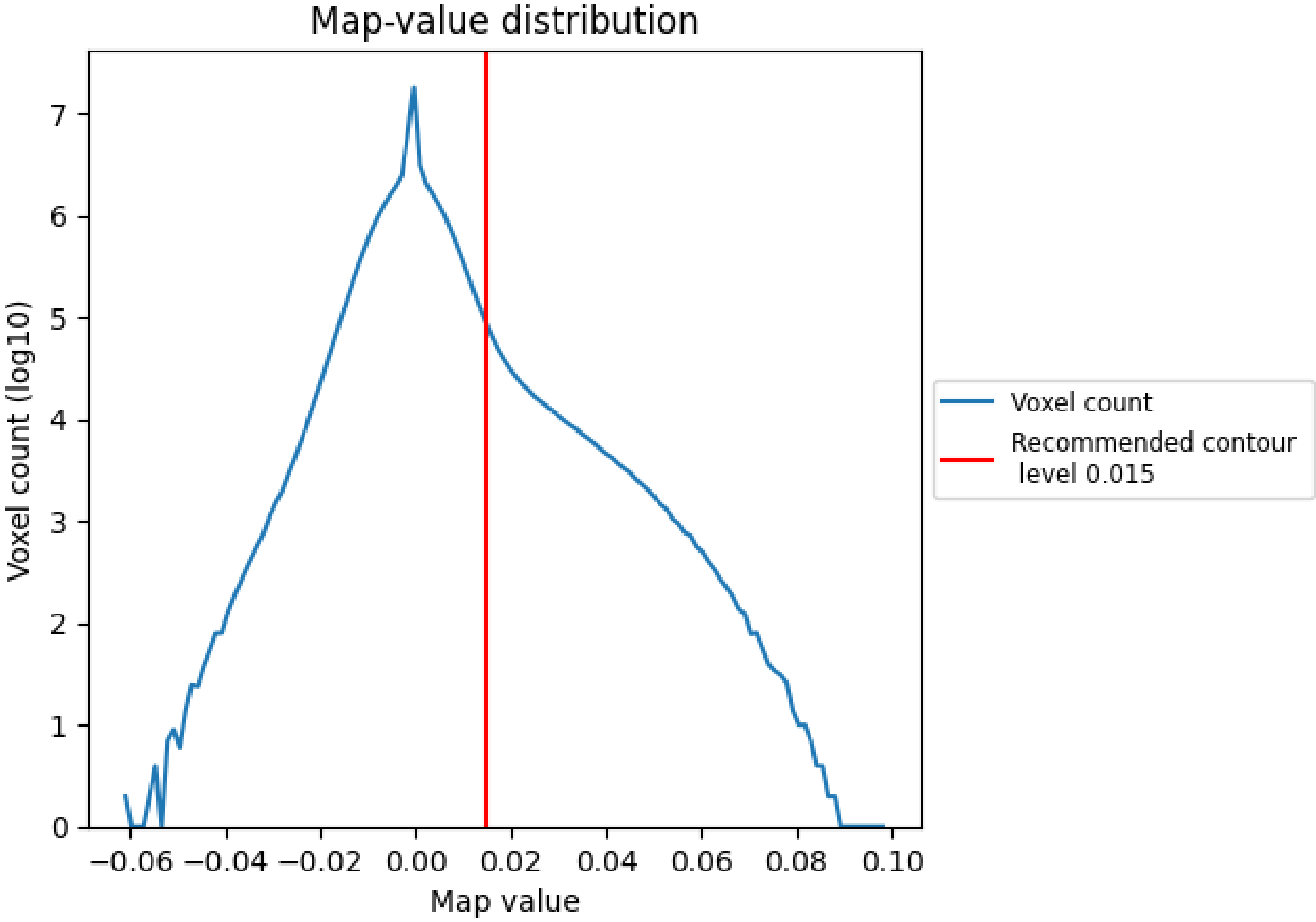
6.6 Mask visualisation ⓘ

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

7 Map analysis ⓘ

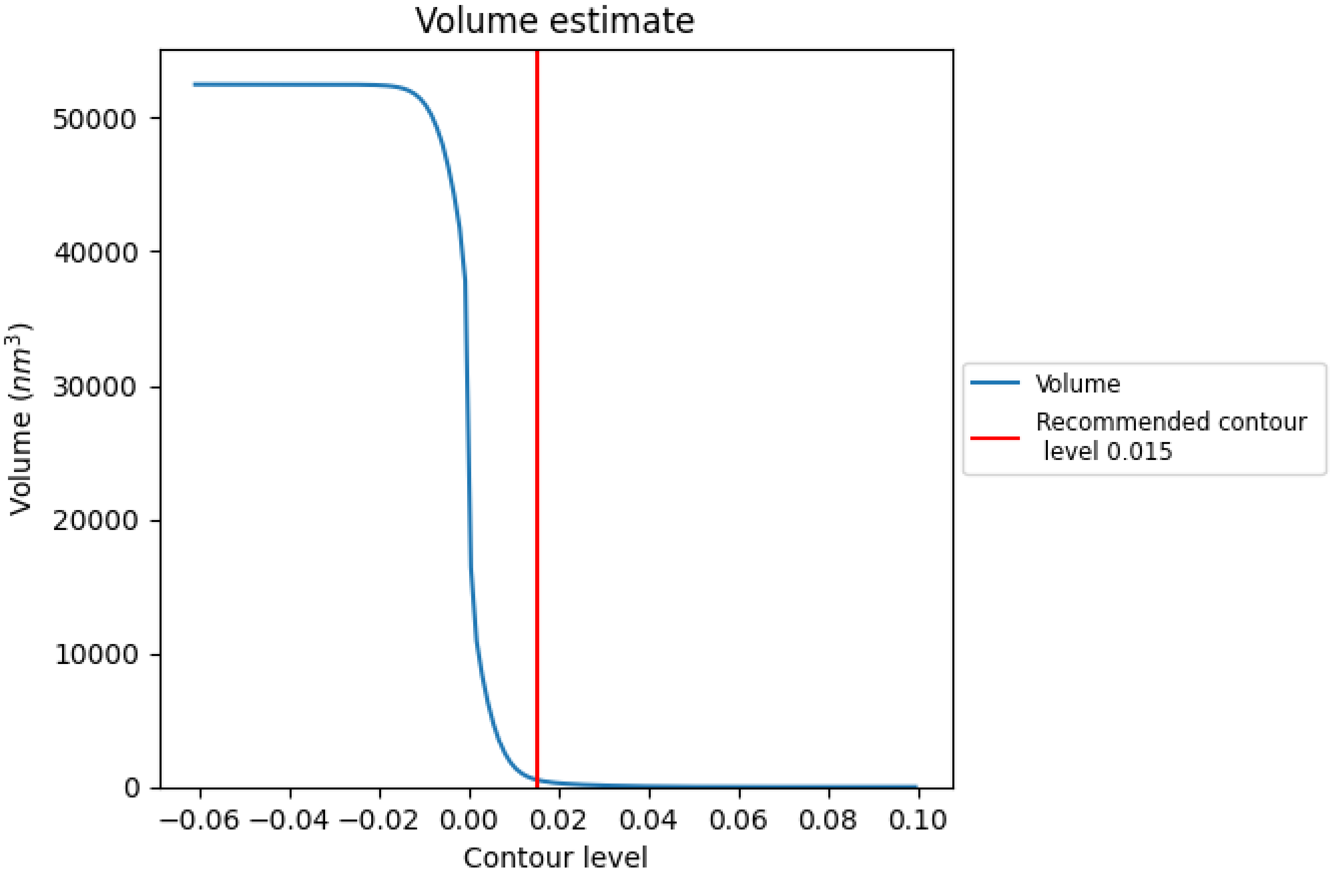
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution ⓘ



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

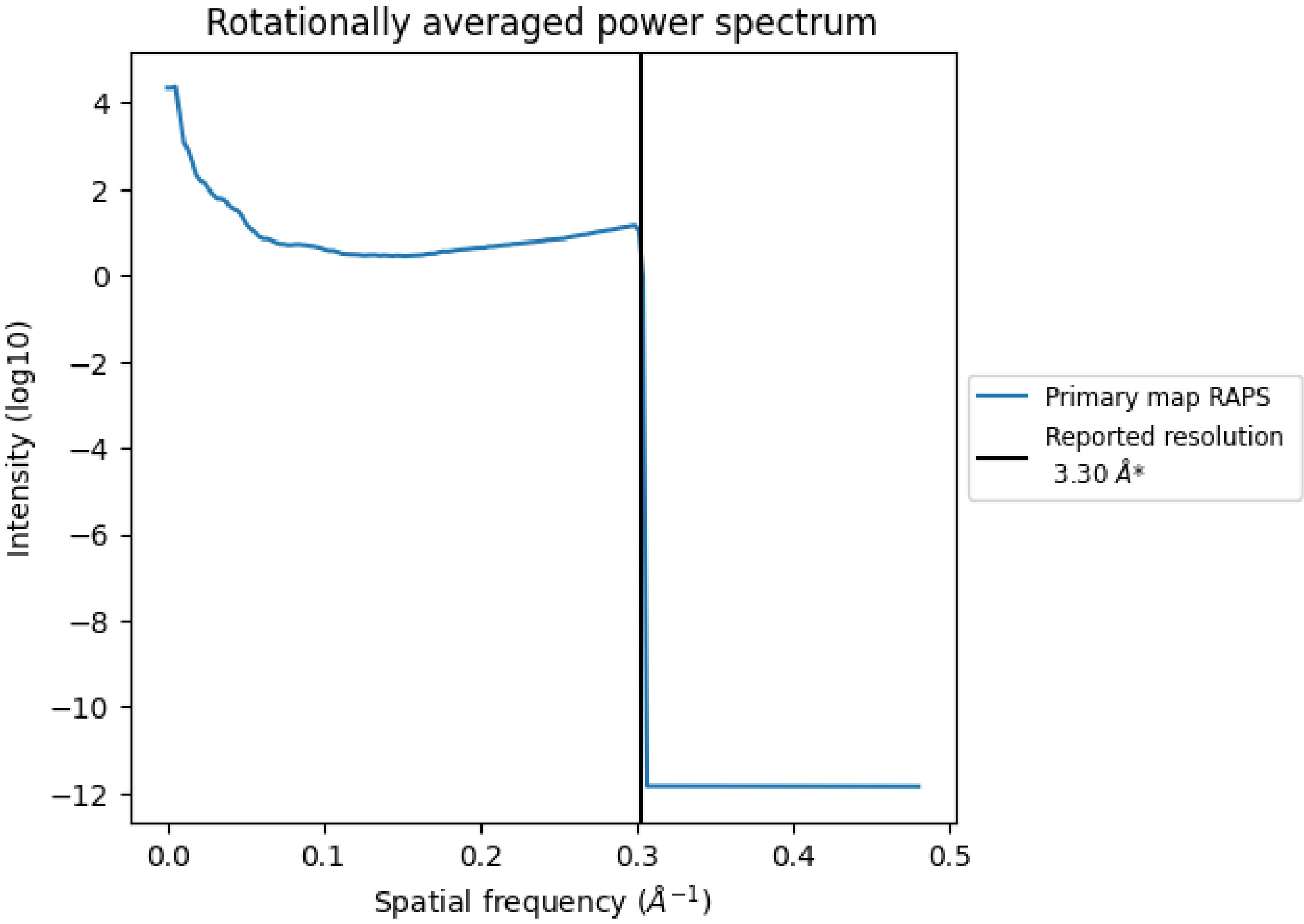
7.2 Volume estimate ⓘ



The volume at the recommended contour level is 540 nm^3; this corresponds to an approximate mass of 488 kDa.

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

7.3 Rotationally averaged power spectrum ⓘ



*Reported resolution corresponds to spatial frequency of 0.303 Å^{-1}

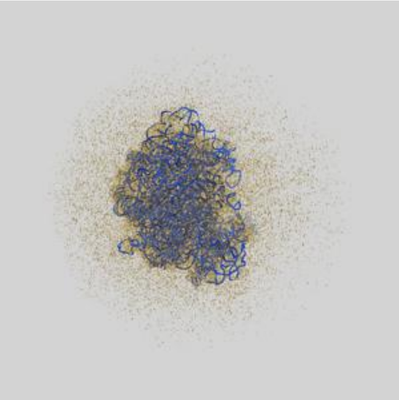
8 Fourier-Shell correlation

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

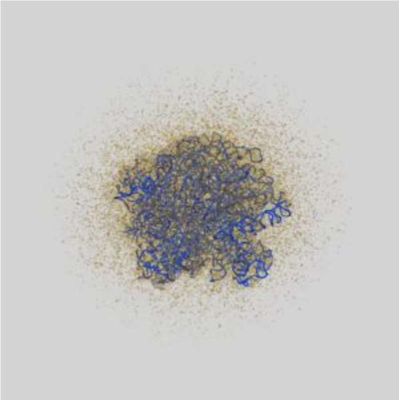
9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-31398 and PDB model 7F0D. Per-residue inclusion information can be found in section 3 on page 10.

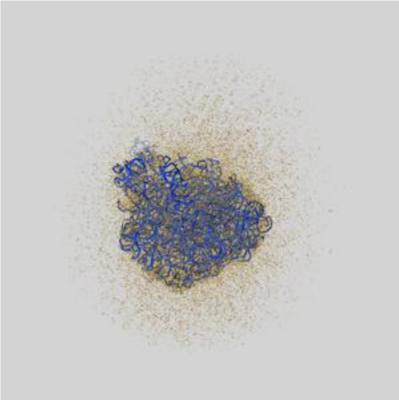
9.1 Map-model overlay ⓘ



X



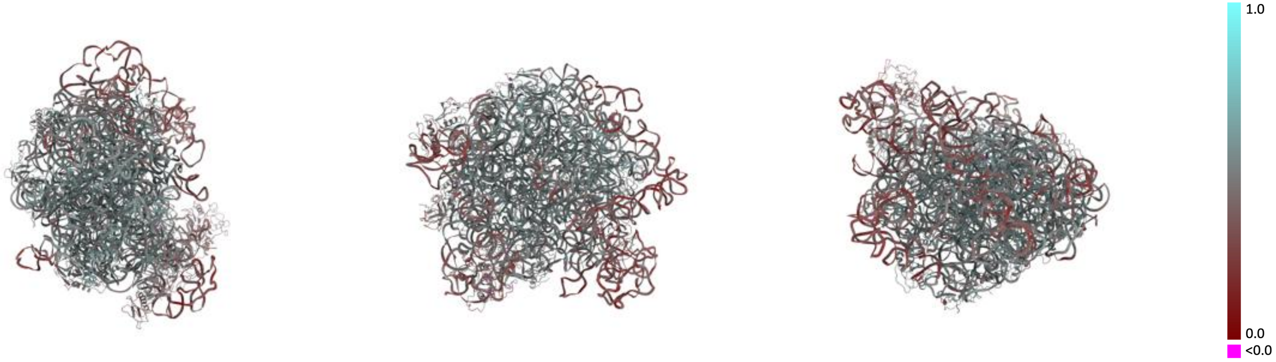
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.015 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

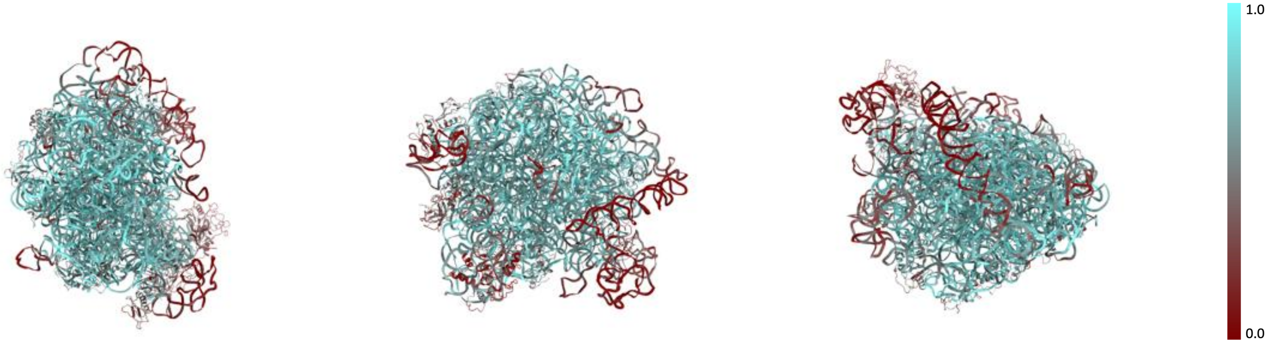
9.2 Q-score mapped to coordinate model ⓘ



X Y Z

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

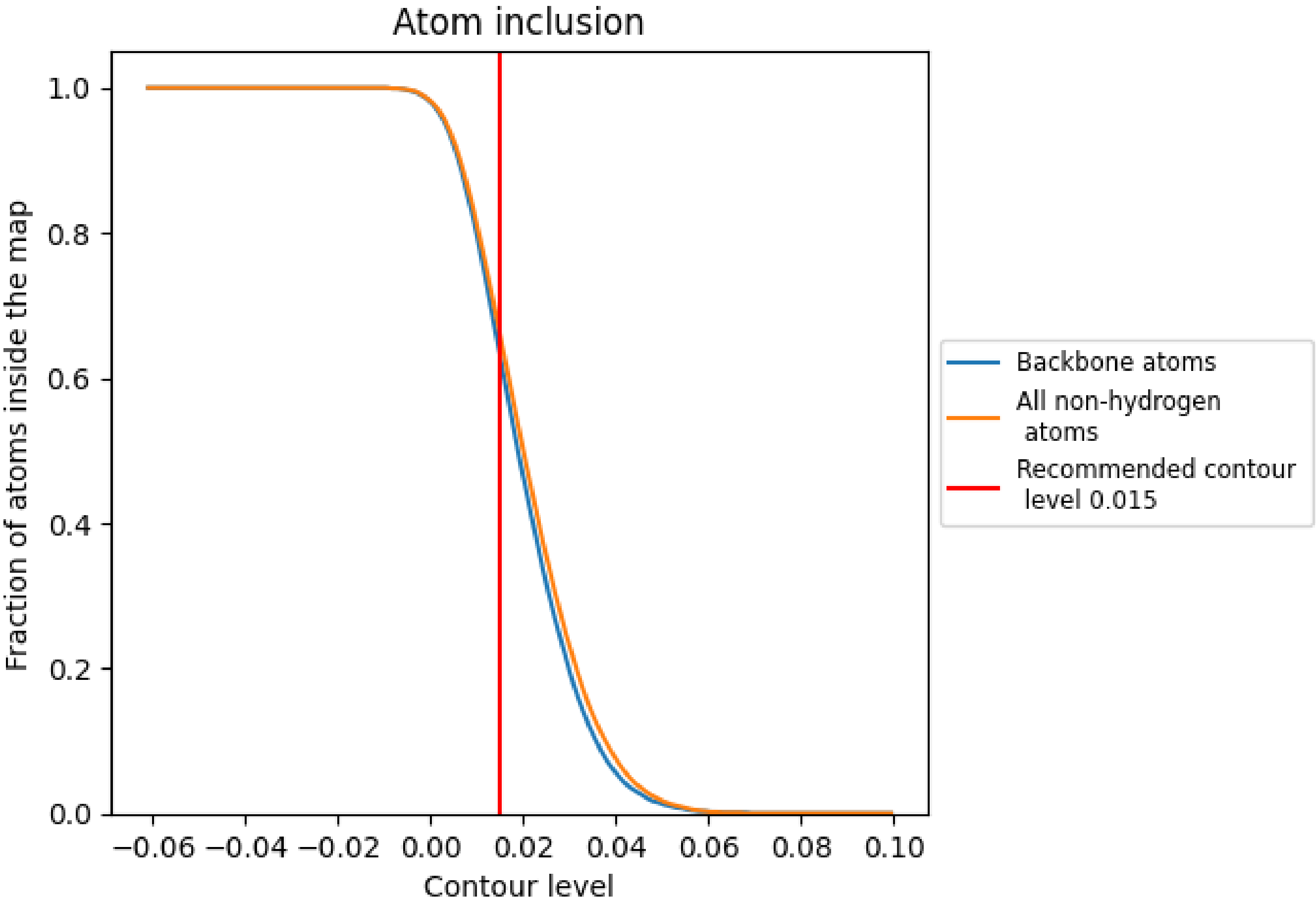
9.3 Atom inclusion mapped to coordinate model ⓘ



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.015).

9.4 Atom inclusion (i)



At the recommended contour level, 63% of all backbone atoms, 66% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.015) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6590	0.4730
0	0.6690	0.5050
1	0.4240	0.4770
2	0.8020	0.5440
3	0.7030	0.5260
4	0.4910	0.5000
6	0.0210	0.3140
A	0.6920	0.4670
B	0.6430	0.4180
C	0.7070	0.5280
D	0.6960	0.5250
E	0.6670	0.5160
F	0.1740	0.3720
G	0.4060	0.4200
H	0.1110	0.4110
J	0.6880	0.5270
K	0.6580	0.5160
L	0.6390	0.5100
M	0.6130	0.5030
N	0.7420	0.5420
O	0.5220	0.4550
P	0.5640	0.4960
Q	0.7610	0.5390
R	0.6860	0.5240
S	0.7270	0.5380
T	0.6300	0.5130
U	0.5840	0.4850
V	0.3410	0.4230
W	0.6860	0.5230
X	0.6810	0.5110
Y	0.6250	0.4870
Z	0.6660	0.5160