



Full wwPDB EM Validation Report ⓘ

Jul 2, 2024 – 09:59 PM JST

PDB ID : 8YOP
EMDB ID : EMD-39456
Title : Cryo-EM structure of the human 80S ribosome with 4 um Tigecycline
Authors : Li, X.; Wang, M.; Denk, T.; Cheng, J.
Deposited on : 2024-03-13
Resolution : 2.20 Å (reported)
Based on initial model : 6Z6M

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev92
MolProbity : 4.02b-467
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) : 2.37.1

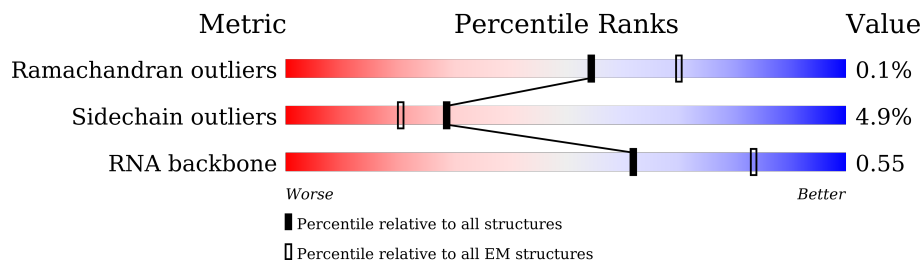
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.20 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	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 $\leq 5\%$. 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	L5	5070	
2	L7	121	
3	L8	157	
4	LA	257	
5	LB	403	
6	LC	427	
7	LD	297	
8	LE	288	

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Mol	Chain	Length	Quality of chain
9	LF	248	88% 9%
10	LG	266	85% 5% 9%
11	LH	192	97% ..
12	LI	214	90% 5% 6%
13	LJ	178	94% ..
14	LL	211	95% .
15	LM	215	64% . 35%
16	LN	204	95% .
17	LO	203	95% . .
18	LP	184	83% 17%
19	LQ	188	99% ..
20	LR	196	92% . 5%
21	LS	176	97% ..
22	LT	160	94% 6% .
23	LU	128	71% 7% 22%
24	LV	140	93% . 6%
25	LW	157	76% . 21%
26	LX	156	74% . 23%
27	LY	145	86% 6% 8%
28	LZ	136	96% ..
29	La	148	98% ..
30	Lb	159	62% 7% 31%
31	Lc	115	83% . 15%
32	Ld	125	83% . 14%
33	Le	135	93% . 5%

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Mol	Chain	Length	Quality of chain
34	Lf	110	95% 5%
35	Lg	117	96%
36	Lh	123	93% 7%
37	Li	105	92% 5%
38	Lj	97	85% 11%
39	Lk	70	96%
40	Ll	51	98%
41	Lm	128	40% 59%
42	Ln	25	92%
43	Lo	106	96%
44	Lp	92	96%
45	Lr	137	89% 9%
46	Ls	317	51% 60% 38%
47	Lt	165	79% 82% 15%
48	Lz	217	94% 94% 6%
49	S2	1869	72% 21% 7%
50	SA	295	71% 25%
51	SB	264	77% 19%
52	SD	243	87% 7% 7%
53	SE	263	98%
54	SF	204	84% 6% 10%
55	SH	194	90% 6%
56	SI	208	95%
57	SK	165	50% 7% 42%
58	SL	158	89% 9%

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Mol	Chain	Length	Quality of chain
59	SP	145	
60	SQ	146	
61	SR	135	
62	SS	152	
63	ST	145	
64	SU	119	
65	SV	83	
66	SX	143	
67	Sa	115	
68	Sc	69	
69	Sd	56	
70	Sg	317	
71	SC	293	
72	SG	249	
73	SJ	194	
74	SM	132	
75	SN	151	
76	SO	151	
77	SW	130	
78	SY	133	
79	SZ	125	
80	Sb	84	
81	Se	59	
82	Sf	156	

2 Entry composition [i](#)

There are 84 unique types of molecules in this entry. The entry contains 218499 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called 28S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	L5	3771	80096	35636	14582	26108	3770	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L5	2113	C	G	conflict	GB 86475748

- Molecule 2 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
2	L7	120	2561	1141	456	844	120	0	0

- Molecule 3 is a RNA chain called 5.8S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
3	L8	156	3314	1480	585	1094	155	0	0

- Molecule 4 is a protein called 60S ribosomal protein L8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	LA	248	1898	1189	389	314	6	0	0

- Molecule 5 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	LB	402	3238	2060	608	556	14	0	0

- Molecule 6 is a protein called 60S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	LC	368	2927	1840	583	489	15	0	0

- Molecule 7 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	LD	293	2382	1507	434	427	14	0	0

- Molecule 8 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	LE	221	1774	1142	336	292	4	0	0

- Molecule 9 is a protein called 60S ribosomal protein L7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	LF	225	1870	1202	358	301	9	0	0

- Molecule 10 is a protein called 60S ribosomal protein L7a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	LG	241	1927	1228	371	324	4	0	0

- Molecule 11 is a protein called 60S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	LH	190	1518	956	284	272	6	0	0

- Molecule 12 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	LI	202	1639	1041	316	269	13	0	0

- Molecule 13 is a protein called 60S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	LJ	176	Total	C	N	O	S	0	0
			1410	888	263	253	6		

- Molecule 14 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	LL	210	Total	C	N	O	S	0	0
			1701	1064	352	281	4		

- Molecule 15 is a protein called 60S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	LM	139	Total	C	N	O	S	0	0
			1138	730	218	183	7		

- Molecule 16 is a protein called 60S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	LN	203	Total	C	N	O	S	0	0
			1701	1072	359	266	4		

- Molecule 17 is a protein called 60S ribosomal protein L13a.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	LO	201	Total	C	N	O	S	0	0
			1650	1063	321	261	5		

- Molecule 18 is a protein called 60S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	LP	153	Total	C	N	O	S	0	0
			1242	776	241	216	9		

- Molecule 19 is a protein called 60S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	LQ	187	Total	C	N	O	S	0	0
			1513	944	314	250	5		

- Molecule 20 is a protein called 60S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	LR	187	1566	971	336	250	9	0	0

- Molecule 21 is a protein called 60S ribosomal protein L18a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	LS	175	1453	925	283	235	10	0	0

- Molecule 22 is a protein called 60S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	LT	159	1298	823	252	217	6	0	0

- Molecule 23 is a protein called 60S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	LU	100	816	524	142	148	2	0	0

- Molecule 24 is a protein called 60S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	LV	131	979	618	184	172	5	0	0

- Molecule 25 is a protein called 60S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	LW	124	1015	634	207	170	4	0	0

- Molecule 26 is a protein called 60S ribosomal protein L23a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	LX	120	985	630	185	169	1	0	0

- Molecule 27 is a protein called 60S ribosomal protein L26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	LY	133	1106	694	224	185	3	0	0

- Molecule 28 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	LZ	135	1107	714	208	182	3	0	0

- Molecule 29 is a protein called 60S ribosomal protein L27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	La	147	1162	736	237	186	3	0	0

- Molecule 30 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	Lb	109	882	549	192	137	4	0	0

- Molecule 31 is a protein called 60S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	Lc	98	764	485	135	138	6	0	0

- Molecule 32 is a protein called 60S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	Ld	107	888	560	171	155	2	0	0

- Molecule 33 is a protein called 60S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	Le	128	1053	667	216	165	5	0	0

- Molecule 34 is a protein called 60S ribosomal protein L35a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	Lf	109	876	555	174	144	3	0	0

- Molecule 35 is a protein called 60S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	Lg	114	906	566	187	147	6	0	0

- Molecule 36 is a protein called 60S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	Lh	122	1015	641	205	168	1	0	0

- Molecule 37 is a protein called 60S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	Li	102	832	521	177	129	5	0	0

- Molecule 38 is a protein called 60S ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	Lj	86	705	434	155	111	5	0	0

- Molecule 39 is a protein called 60S ribosomal protein L38.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	Lk	69	569	366	103	99	1	0	0

- Molecule 40 is a protein called 60S ribosomal protein L39.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	Ll	50	444	281	98	64	1	0	0

- Molecule 41 is a protein called Ubiquitin-60S ribosomal protein L40.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	Lm	52	Total	C	N	O	S	0	0
			429	266	90	67	6		

- Molecule 42 is a protein called 60S ribosomal protein L41.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	Ln	24	Total	C	N	O	S	0	0
			230	139	62	26	3		

- Molecule 43 is a protein called 60S ribosomal protein L36a.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	Lo	105	Total	C	N	O	S	0	0
			862	542	175	139	6		

- Molecule 44 is a protein called 60S ribosomal protein L37a.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	Lp	91	Total	C	N	O	S	0	0
			708	445	136	120	7		

- Molecule 45 is a protein called 60S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	Lr	125	Total	C	N	O	S	0	0
			1002	622	207	168	5		

- Molecule 46 is a protein called Large ribosomal subunit protein uL10.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	Ls	196	Total	C	N	O	S	0	0
			1496	952	259	276	9		

- Molecule 47 is a protein called 60S ribosomal protein L12.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	Lt	141	Total	C	N	O	S	0	0
			1046	652	191	199	4		

- Molecule 48 is a protein called 60S ribosomal protein L10a.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
48	Lz	205	1018	607	205	206	0	0

- Molecule 49 is a RNA chain called 18S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
49	S2	1740	36896	16458	6597	12102	1739	0	0

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
S2	582	C	U	conflict	GB 36162
S2	583	C	A	conflict	GB 36162
S2	584	G	A	conflict	GB 36162
S2	798	A	G	conflict	GB 36162
S2	1095	U	C	conflict	GB 36162

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	SA	221	1741	1106	305	322	8	0	0

- Molecule 51 is a protein called 40S ribosomal protein S3a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	SB	214	1738	1103	310	311	14	0	0

- Molecule 52 is a protein called 40S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	SD	227	1765	1125	317	315	8	0	0

- Molecule 53 is a protein called 40S ribosomal protein S4, X isoform.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	SE	262	2076	1324	386	358	8	0	0

- Molecule 54 is a protein called 40S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
54	SF	184	1461	914	276	264	7	0	0

- Molecule 55 is a protein called 40S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
55	SH	186	1497	956	274	266	1	0	0

- Molecule 56 is a protein called 40S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
56	SI	206	1686	1058	332	291	5	0	0

- Molecule 57 is a protein called 40S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
57	SK	95	799	524	139	130	6	0	0

- Molecule 58 is a protein called 40S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
58	SL	144	1182	752	224	200	6	0	0

- Molecule 59 is a protein called 40S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
59	SP	129	1061	672	202	180	7	0	0

- Molecule 60 is a protein called 40S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
60	SQ	144	1142	726	216	197	3	0	0

- Molecule 61 is a protein called 40S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
61	SR	135	1090	685	202	198	5	0	0

- Molecule 62 is a protein called 40S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
62	SS	144	1190	746	241	202	1	0	0

- Molecule 63 is a protein called 40S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
63	ST	143	1112	697	214	198	3	0	0

- Molecule 64 is a protein called 40S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
64	SU	104	821	514	155	148	4	0	0

- Molecule 65 is a protein called 40S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
65	SV	83	636	393	117	121	5	0	0

- Molecule 66 is a protein called 40S ribosomal protein S23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
66	SX	141	1098	693	219	183	3	0	0

- Molecule 67 is a protein called 40S ribosomal protein S26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
67	Sa	102	821	512	171	133	5	0	0

- Molecule 68 is a protein called 40S ribosomal protein S28.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	Sc	64	Total	C	N	O	S	0	0
			506	308	102	94	2		

- Molecule 69 is a protein called 40S ribosomal protein S29.

Mol	Chain	Residues	Atoms					AltConf	Trace
69	Sd	55	Total	C	N	O	S	0	0
			459	286	94	74	5		

- Molecule 70 is a protein called Receptor of activated protein C kinase 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	Sg	313	Total	C	N	O	S	0	0
			2436	1535	424	465	12		

- Molecule 71 is a protein called 40S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	SC	222	Total	C	N	O	S	0	0
			1725	1115	298	302	10		

- Molecule 72 is a protein called 40S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
72	SG	237	Total	C	N	O	S	0	0
			1923	1200	387	329	7		

- Molecule 73 is a protein called 40S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
73	SJ	185	Total	C	N	O	S	0	0
			1525	969	306	248	2		

- Molecule 74 is a protein called 40S ribosomal protein S12.

Mol	Chain	Residues	Atoms				AltConf	Trace
74	SM	122	Total	C	N	O	0	0
			604	359	122	123		

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
SM	52	GLN	LEU	conflict	UNP P25398
SM	69	LEU	CYS	conflict	UNP P25398
SM	99	ASN	LYS	conflict	UNP P25398

- Molecule 75 is a protein called 40S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
75	SN	150	1208	773	229	205	1	0	0

- Molecule 76 is a protein called 40S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
76	SO	135	1010	618	198	188	6	0	0

- Molecule 77 is a protein called 40S ribosomal protein S15a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
77	SW	129	1034	659	193	176	6	0	0

- Molecule 78 is a protein called 40S ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
78	SY	126	1027	648	201	173	5	0	0

- Molecule 79 is a protein called 40S ribosomal protein S25.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
79	SZ	75	598	382	111	104	1	0	0

- Molecule 80 is a protein called 40S ribosomal protein S27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
80	Sb	83	651	408	121	115	7	0	0

- Molecule 81 is a protein called 40S ribosomal protein S30.

Mol	Chain	Residues	Atoms					AltConf	Trace
81	Se	58	Total	C	N	O	S	0	0
			459	284	100	74	1		

- Molecule 82 is a protein called Ubiquitin-40S ribosomal protein S27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
82	Sf	67	Total	C	N	O	S	0	0
			548	346	102	93	7		

- Molecule 83 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
83	L5	212	Total	Mg	0
			212	212	
83	L7	2	Total	Mg	0
			2	2	
83	L8	5	Total	Mg	0
			5	5	
83	LA	1	Total	Mg	0
			1	1	
83	LI	1	Total	Mg	0
			1	1	
83	LP	1	Total	Mg	0
			1	1	
83	LV	1	Total	Mg	0
			1	1	
83	Le	2	Total	Mg	0
			2	2	
83	S2	29	Total	Mg	0
			29	29	
83	SG	1	Total	Mg	0
			1	1	

- Molecule 84 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
84	Lg	1	Total	Zn	0
			1	1	
84	Lj	1	Total	Zn	0
			1	1	
84	Lm	1	Total	Zn	0
			1	1	

Continued on next page...

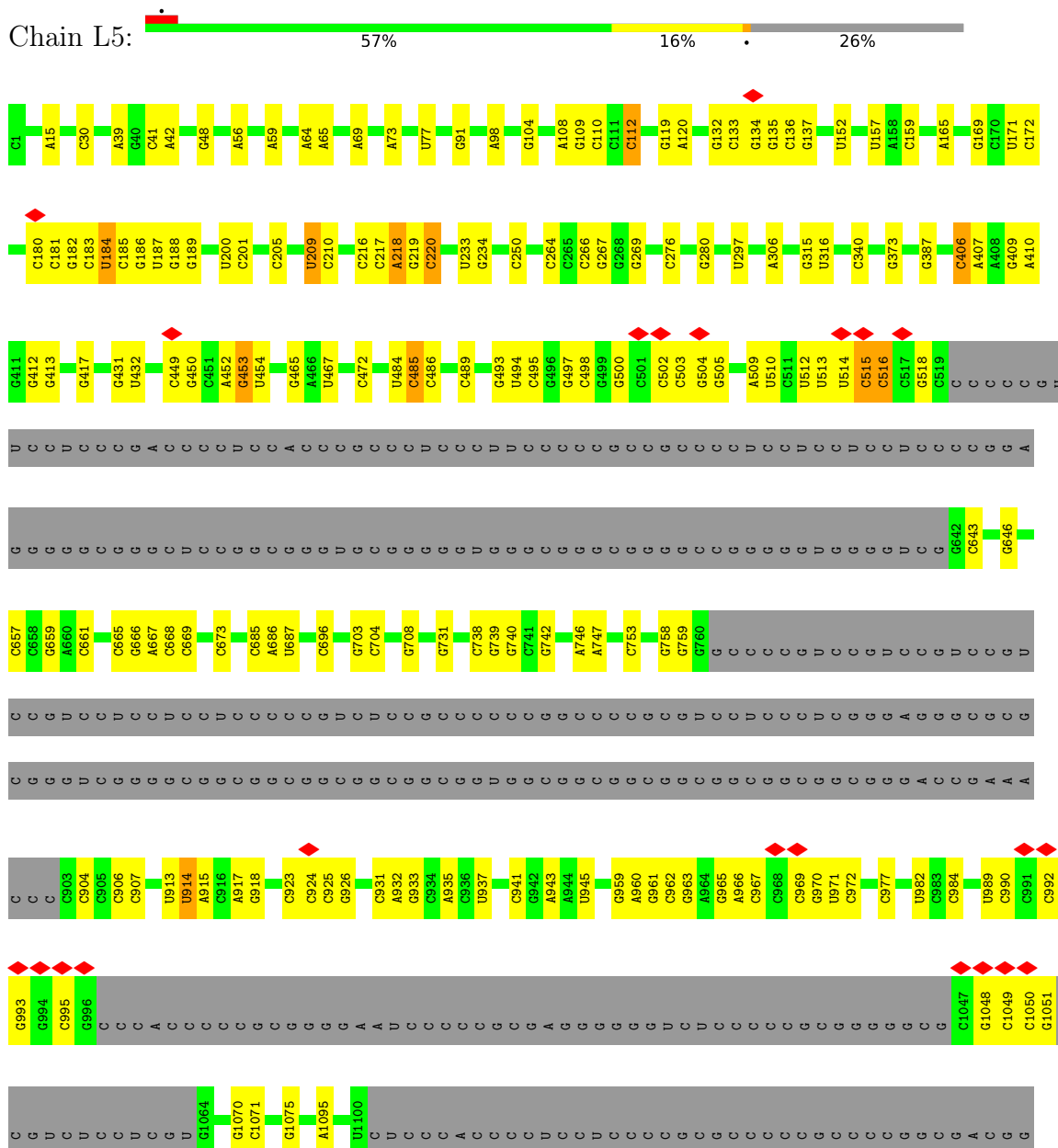
Continued from previous page...

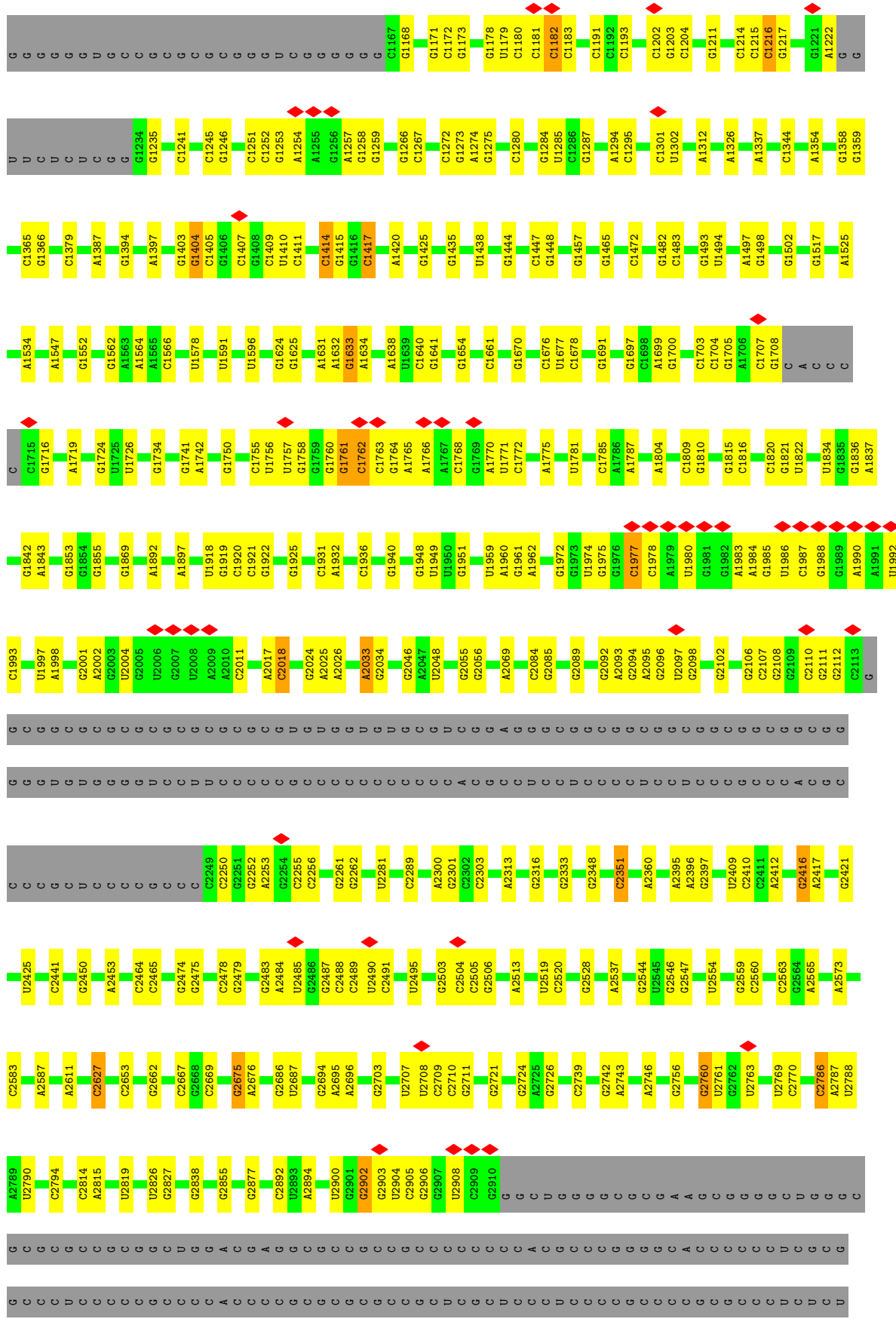
Mol	Chain	Residues	Atoms		AltConf
84	Lo	1	Total 1	Zn 1	0
84	Lp	1	Total 1	Zn 1	0
84	Sa	1	Total 1	Zn 1	0
84	Sd	1	Total 1	Zn 1	0
84	Sf	1	Total 1	Zn 1	0

3 Residue-property plots [i](#)

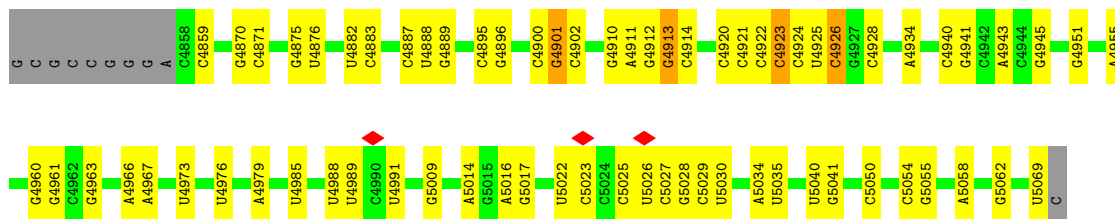
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: 28S rRNA





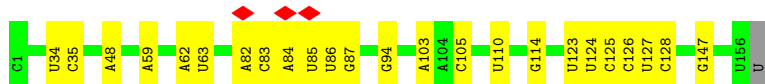
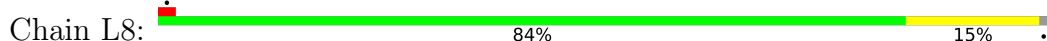
G	U3786	G3956	G4016	A4098	A4283	G4448	A4672	G
C	G3811	U3957	G4017	G4099	A4283	G4448	A4672	G
C	G3812	G3958	G4018	C4100	C4241	U4449	G4679	G
C	A3813	U3959	G4019	C4101	C4241	U4450	A4687	G
C	U3814	A3960	G4020	C4102	A4251	C4453	A4687	G
C	A3817	G3961	U4021	C4103	G4254	C4461	G4689	C
C	U3818	A3962	C4022	A4104	A4257	C4464	C4695	C
C	G3819	A3963	G4023	G4106	A4265	A4464	U4699	C
C	C3618	U3964	C4024	G4107	C4265	G4475	A4700	C
C	G3626	A3965	C4025	G4108	A4268	C4476	A4708	C
C	A3635	A3966	G4026	G4111	A4268	A4488	U4709	C
C	C3636	G3967	G4027	U4111	A4273	A4488	C4714	C
C	U3644	U3968	C4028	C4114	A4273	U4500	C4714	C
C	U3645	G3969	G4029	G4115	A4281	U4500	G4719	C
C	A3646	G3970	G4032	C4116	A4281	U4501	G4720	C
C	A3648	G3971	G4033	U4117	G4291	C4502	C4720	C
C	A3662	G3972	G4034	U4118	G4291	U4512	A4734	C
C	C3673	A3973	G4035	C4119	U4296	A4513	C4741	A
C	G3674	G3974	G4036	U4120	A4303	G4514	C4741	A
C	U3713	C3975	G4037	G4121	A4304	G4515	G4742	G
C	G3714	G3976	G4038	G4122	A4305	G4516	G4745	G
C	U3715	C3977	G4039	A4127	U4306	C4519	G4745	G
C	U3727	G3978	G4040	C4137	G4314	G4524	C4747	C
C	C3741	C3979	C4041	C4138	C4314	G4524	C4747	C
C	A3748	G3980	C4042	C4139	C4319	G4545	G4750	C
C	C3749	G3981	G4043	G4139	C4319	G4545	G4754	C
C	G3750	G3982	G4044	G4140	G4329	A4548	C4757	G
C	G3753	G3983	U4044	C4141	G4330	G4549	U4758	G
C	G3757	G3984	G4045	G4142	G4331	U4557	C4759	G
C	U3759	C3985	G4046	C4143	C4332	C4560	G4760	C
C	A3760	G3986	A4046	G4144	U4332	C4560	G4761	C
C	C3761	C3987	A4047	C4145	C4337	G4567	G4761	C
C	C3767	G3988	U4048	G4146	G4373	G4567	A4764	G
C	G3771	C3989	U4049	G4147	G4373	G4567	G4765	G
C	U3772	G3990	A4050	C4148	A4376	U4572	G4765	G
C	A3775	G3991	C4051	G4149	G4377	U4573	C4771	A
C	G3776	G3992	C4052	C4150	A4378	G4574	C4772	G
C	C3777	U3993	A4053	G4151	A4379	G4575	C4773	G
C	U3778	G3994	C4054	C4152	C4387	A4590	C4774	G
C	A3784	U3995	U4055	U4163	C4387	G4600	C4775	G
C	U3785	G3996	A4056	A4170	G4391	G4600	G4776	C
C	A3788	C3997	C4057	G4183	G4391	G4617	C	C
C	C3584	C3998	U4058	G4184	A4394	U4636	U	U
C	G3585	C3999	U4059	G4191	U4399	G4637	G	G
C	C3586	G4000	G4060	G4196	U4404	U4656	C	C
C	C3587	C4001	A4062	G4199	A4422	U4657	C	C
C	C3588	G4002	U4063	A4203	C4422	C4670	C	C
C	G3589	A4003	G4064	G4222	C4426	C4671	C	C
C	C3590	G4004	G4065	U4229	C4426	C4671	C	C
C	G3591	G4005	U4066	U4229	C4426	C4671	C	C
C	C3592	G4006	G4076	U4229	C4426	C4671	C	C
C	G3593	C4007	G4084	U4229	C4426	C4671	C	C
C	C3594	C4008	A4085	U4229	C4426	C4671	C	C
C	U3595	C4009	G4086	U4229	C4426	C4671	C	C
C	A3596	C4010	G4094	U4229	C4426	C4671	C	C
C	C	G4011	G4097	U4229	C4426	C4671	C	C
C	C	G4012	G4097	U4229	C4426	C4671	C	C
C	C	G4013	G4097	U4229	C4426	C4671	C	C
C	C	G4014	G4097	U4229	C4426	C4671	C	C



• Molecule 2: 5S rRNA



• Molecule 3: 5.8S rRNA



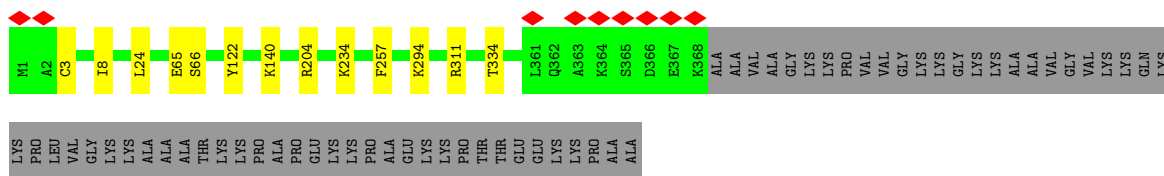
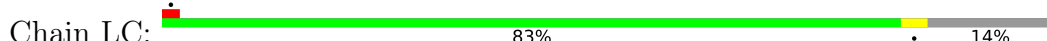
• Molecule 4: 60S ribosomal protein L8



• Molecule 5: 60S ribosomal protein L3

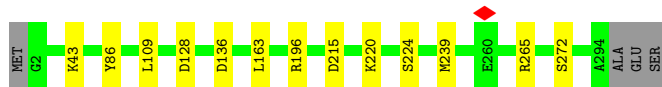


• Molecule 6: 60S ribosomal protein L4



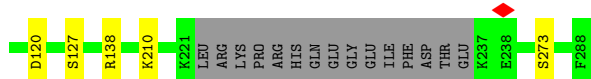
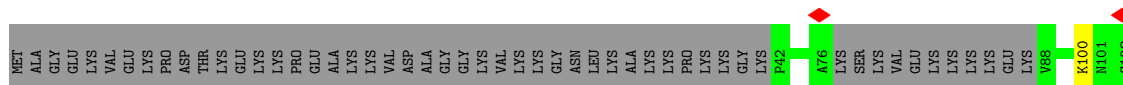
• Molecule 7: 60S ribosomal protein L5





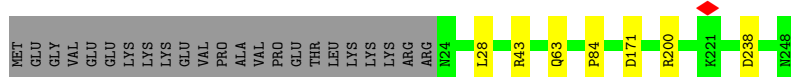
- Molecule 8: 60S ribosomal protein L6

Chain LE: 75% 23%



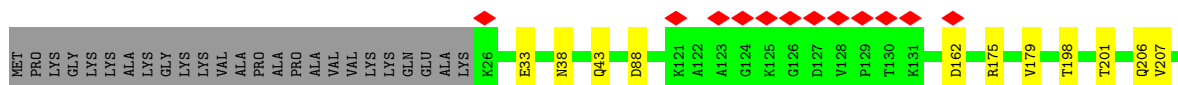
- Molecule 9: 60S ribosomal protein L7

Chain LF: 88% 9%



- Molecule 10: 60S ribosomal protein L7a

Chain LG: 6% 85% 5% 9%



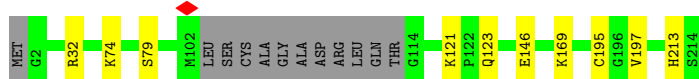
- Molecule 11: 60S ribosomal protein L9

Chain LH: 97%

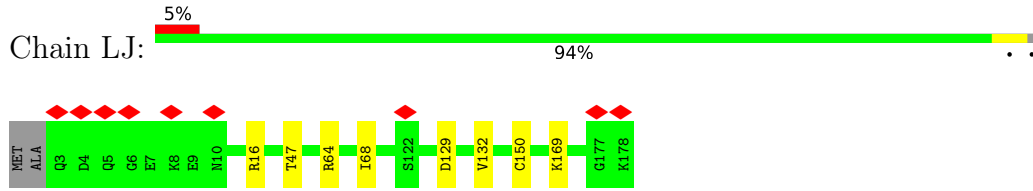


- Molecule 12: Large ribosomal subunit protein uL16

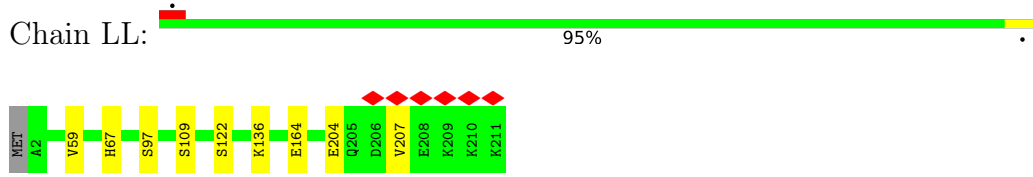
Chain LI: 90% 5% 6%



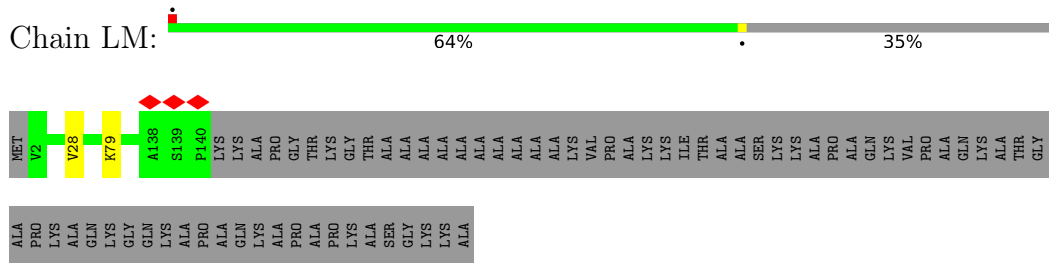
- Molecule 13: 60S ribosomal protein L11



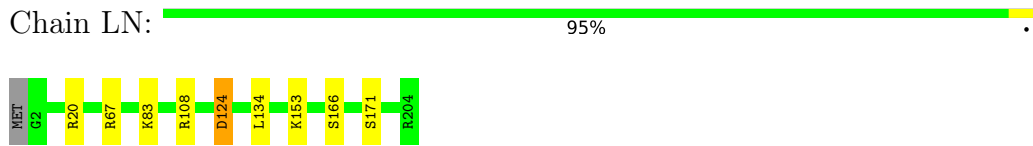
● Molecule 14: 60S ribosomal protein L13



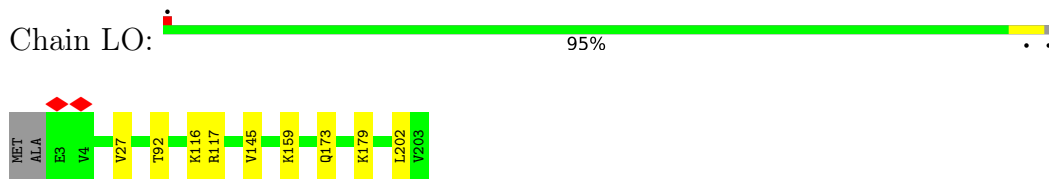
● Molecule 15: 60S ribosomal protein L14



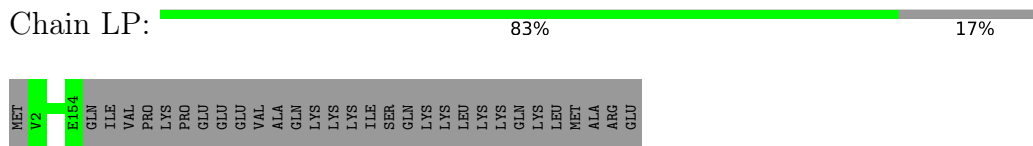
● Molecule 16: 60S ribosomal protein L15



● Molecule 17: 60S ribosomal protein L13a

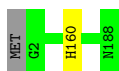


● Molecule 18: 60S ribosomal protein L17

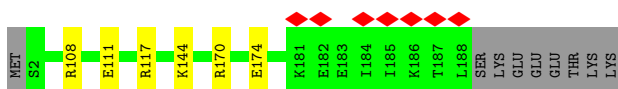


● Molecule 19: 60S ribosomal protein L18

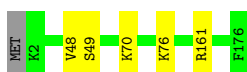




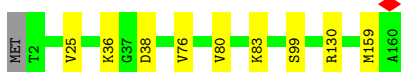
• Molecule 20: 60S ribosomal protein L19



• Molecule 21: 60S ribosomal protein L18a



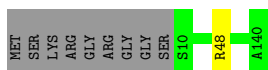
• Molecule 22: 60S ribosomal protein L21



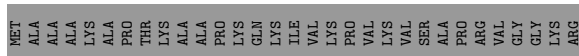
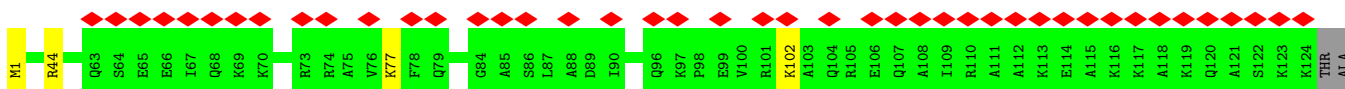
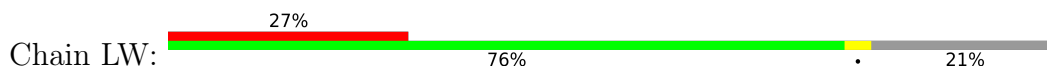
• Molecule 23: 60S ribosomal protein L22



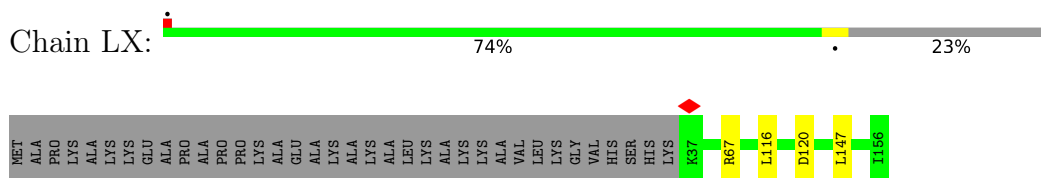
• Molecule 24: 60S ribosomal protein L23



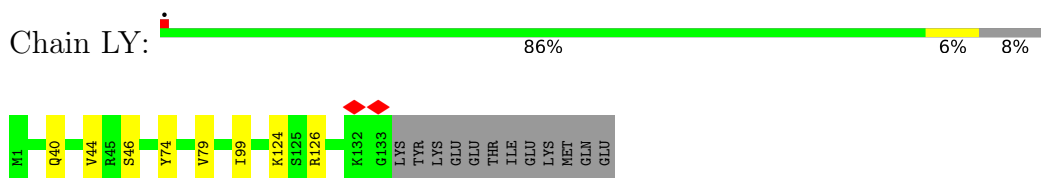
• Molecule 25: 60S ribosomal protein L24



• Molecule 26: 60S ribosomal protein L23a



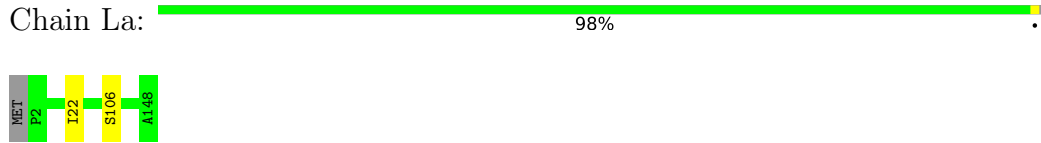
• Molecule 27: 60S ribosomal protein L26



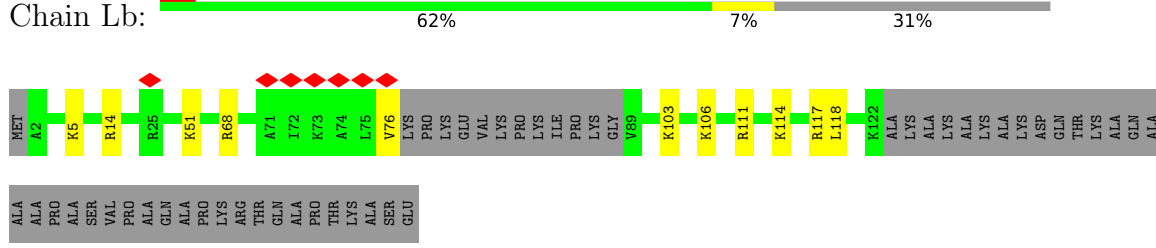
• Molecule 28: 60S ribosomal protein L27



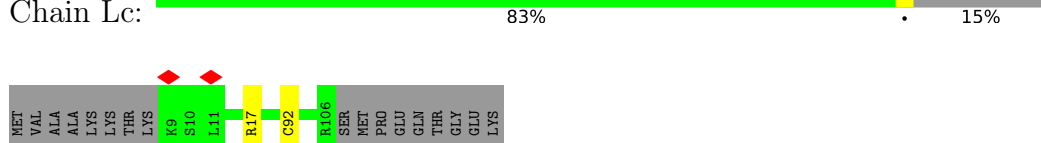
• Molecule 29: 60S ribosomal protein L27a



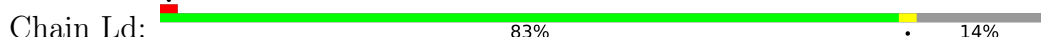
• Molecule 30: 60S ribosomal protein L29

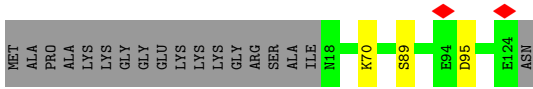


• Molecule 31: 60S ribosomal protein L30

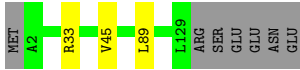


• Molecule 32: 60S ribosomal protein L31





• Molecule 33: 60S ribosomal protein L32



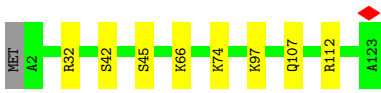
• Molecule 34: 60S ribosomal protein L35a



• Molecule 35: 60S ribosomal protein L34



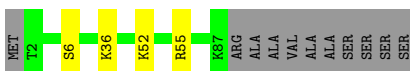
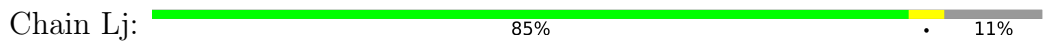
• Molecule 36: 60S ribosomal protein L35



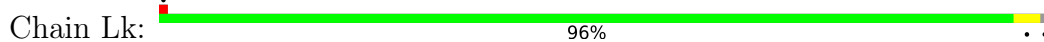
• Molecule 37: 60S ribosomal protein L36

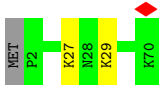


• Molecule 38: 60S ribosomal protein L37



• Molecule 39: 60S ribosomal protein L38

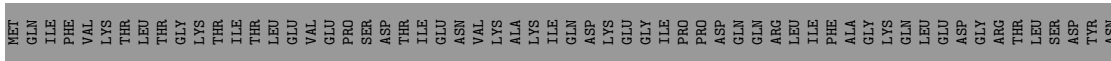




- Molecule 40: 60S ribosomal protein L39



- Molecule 41: Ubiquitin-60S ribosomal protein L40



- Molecule 42: 60S ribosomal protein L41



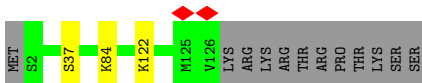
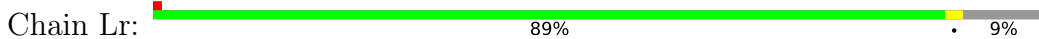
- Molecule 43: 60S ribosomal protein L36a

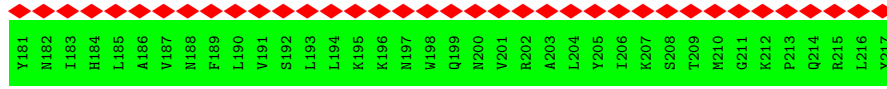


- Molecule 44: 60S ribosomal protein L37a

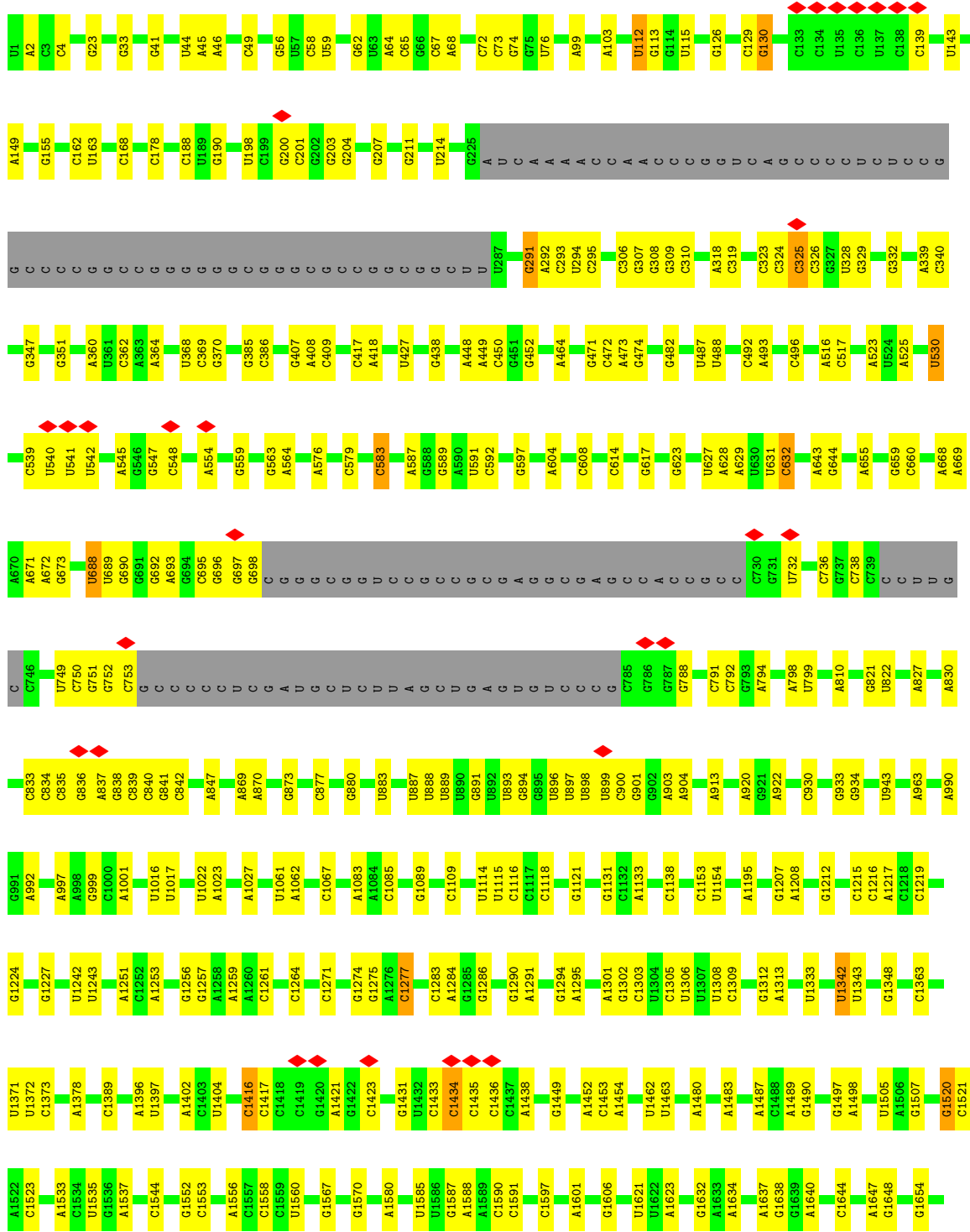


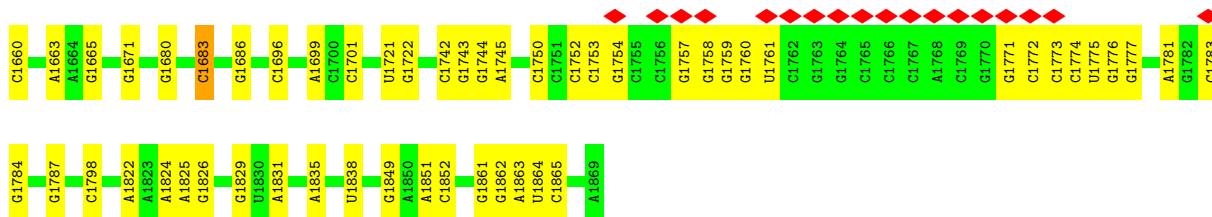
- Molecule 45: 60S ribosomal protein L28



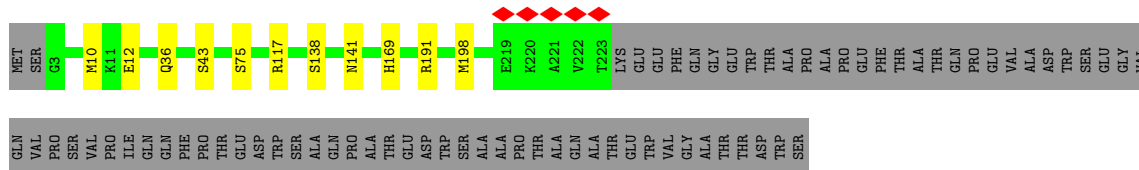
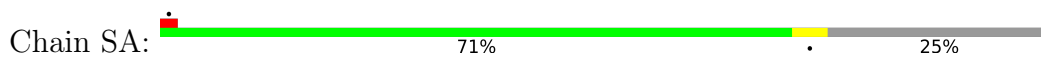


• Molecule 49: 18S rRNA

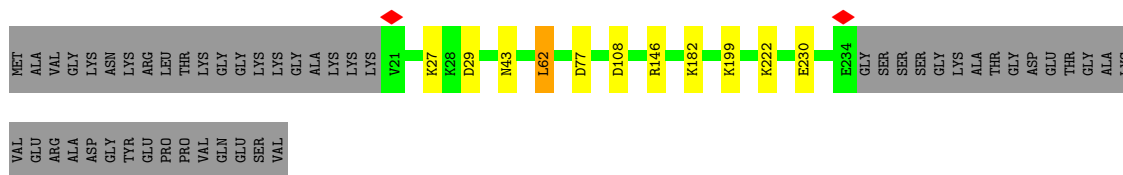
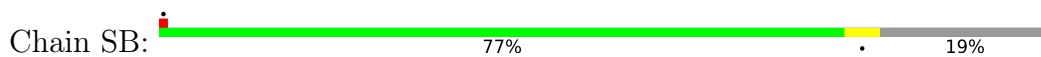




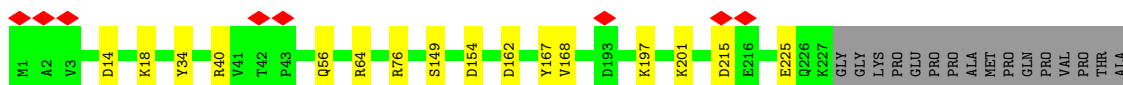
• Molecule 50: 40S ribosomal protein SA



• Molecule 51: 40S ribosomal protein S3a



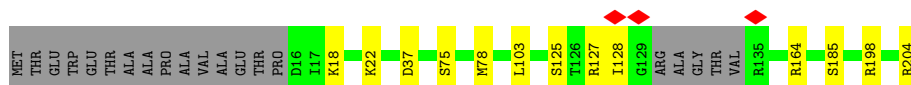
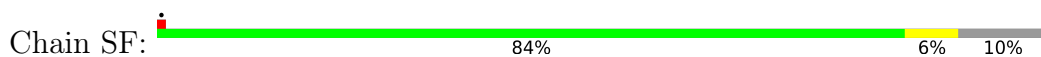
• Molecule 52: 40S ribosomal protein S3



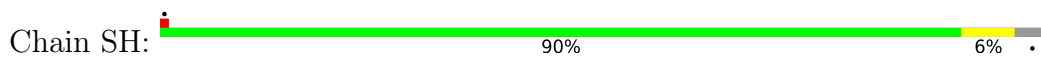
• Molecule 53: 40S ribosomal protein S4, X isoform



• Molecule 54: 40S ribosomal protein S5



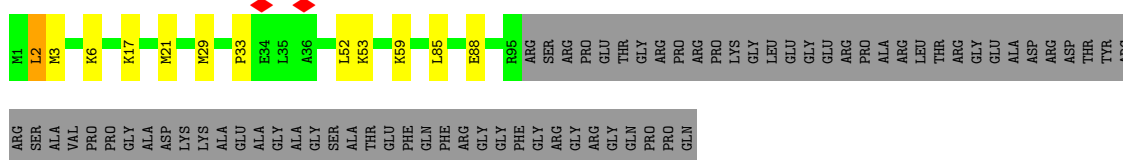
• Molecule 55: 40S ribosomal protein S7



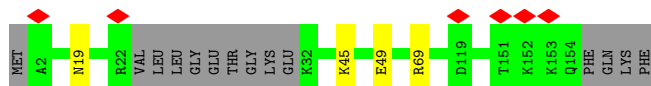
• Molecule 56: 40S ribosomal protein S8



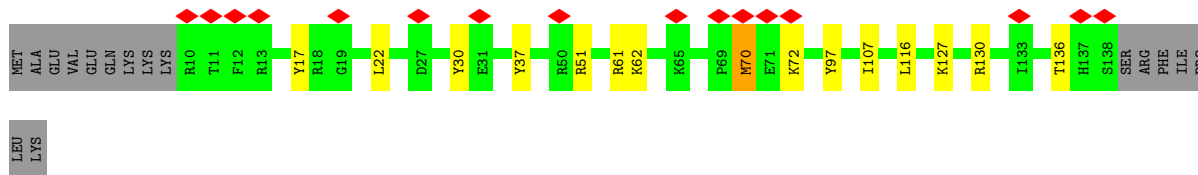
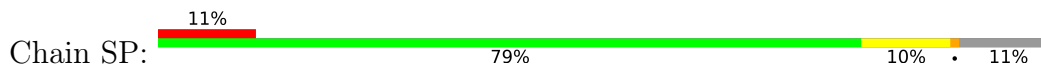
• Molecule 57: 40S ribosomal protein S10



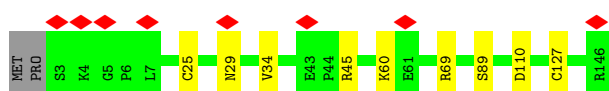
• Molecule 58: 40S ribosomal protein S11



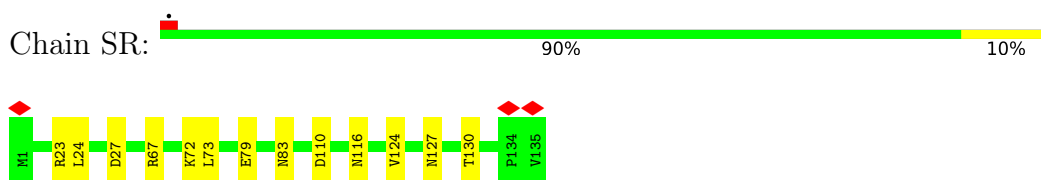
• Molecule 59: 40S ribosomal protein S15



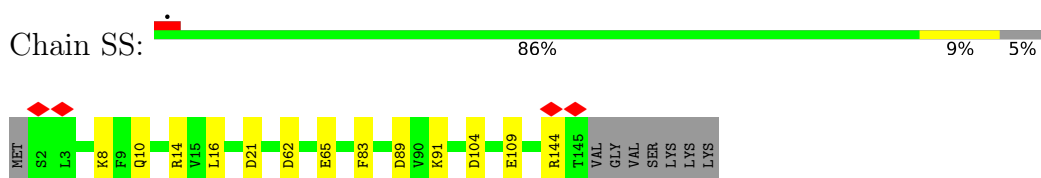
• Molecule 60: 40S ribosomal protein S16



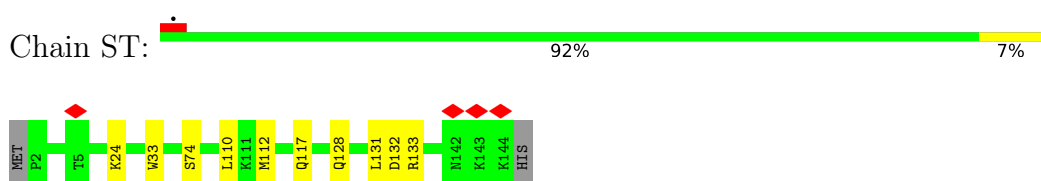
- Molecule 61: 40S ribosomal protein S17



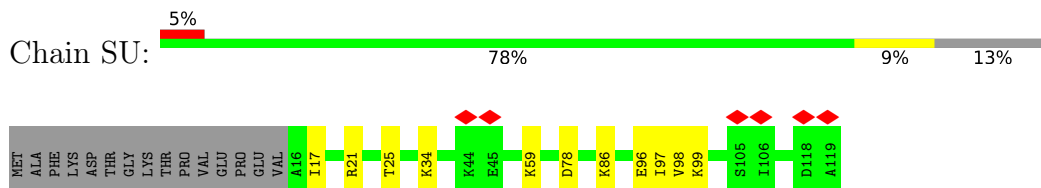
- Molecule 62: 40S ribosomal protein S18



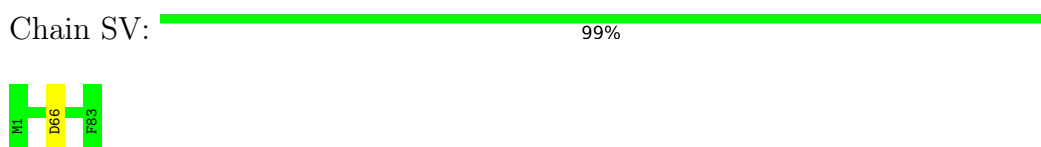
- Molecule 63: 40S ribosomal protein S19



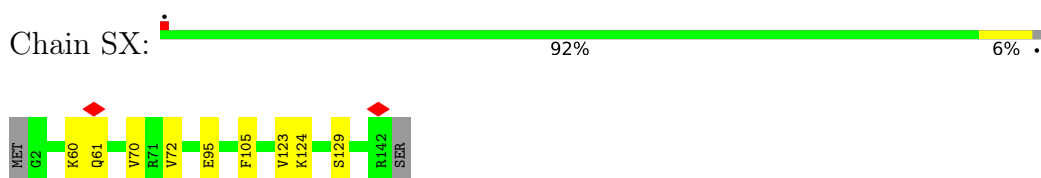
- Molecule 64: 40S ribosomal protein S20



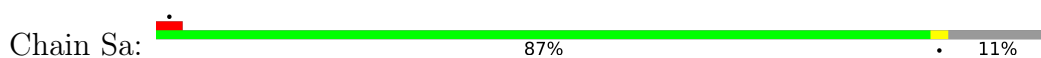
- Molecule 65: 40S ribosomal protein S21

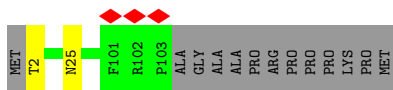


- Molecule 66: 40S ribosomal protein S23

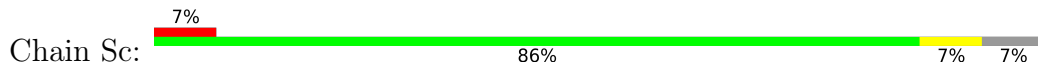


- Molecule 67: 40S ribosomal protein S26

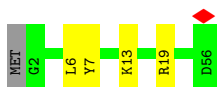




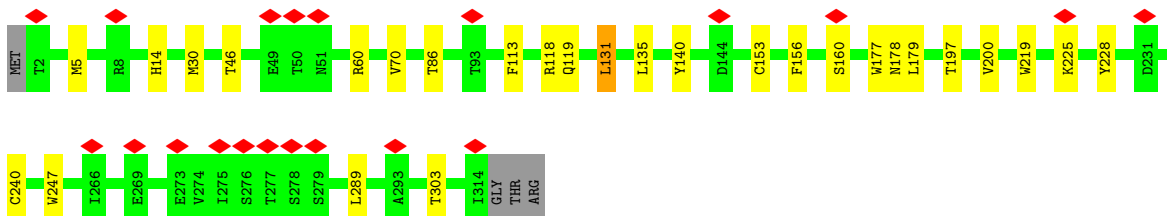
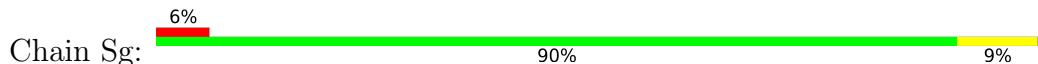
- Molecule 68: 40S ribosomal protein S28



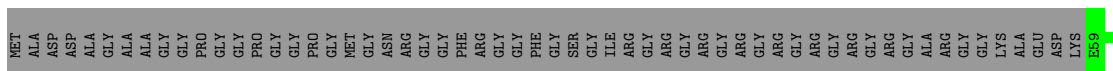
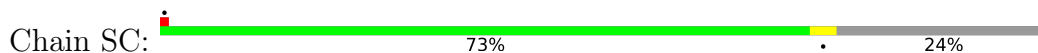
- Molecule 69: 40S ribosomal protein S29



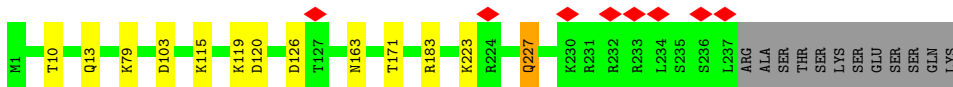
- Molecule 70: Receptor of activated protein C kinase 1



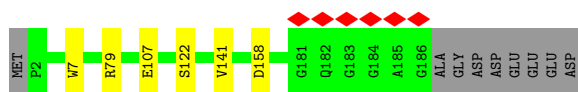
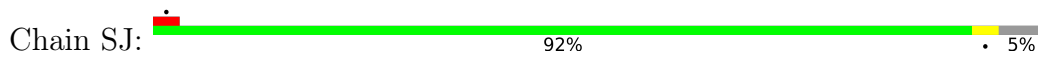
- Molecule 71: 40S ribosomal protein S2



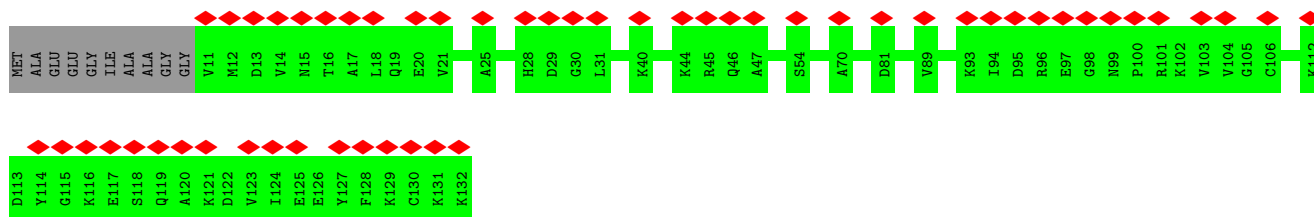
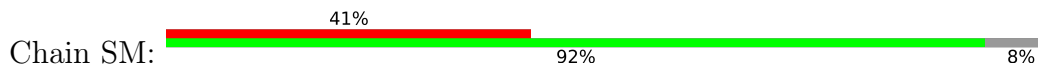
- Molecule 72: 40S ribosomal protein S6



- Molecule 73: 40S ribosomal protein S9



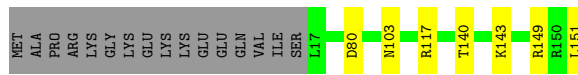
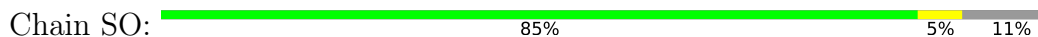
- Molecule 74: 40S ribosomal protein S12



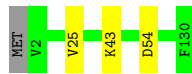
- Molecule 75: 40S ribosomal protein S13



- Molecule 76: 40S ribosomal protein S14



- Molecule 77: 40S ribosomal protein S15a

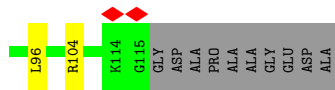
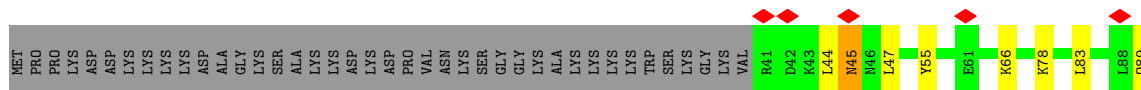


- Molecule 78: 40S ribosomal protein S24



- Molecule 79: 40S ribosomal protein S25

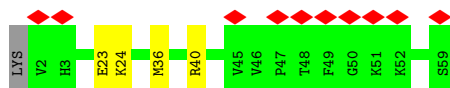
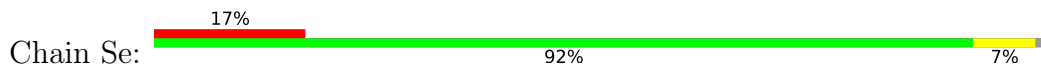




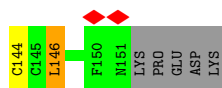
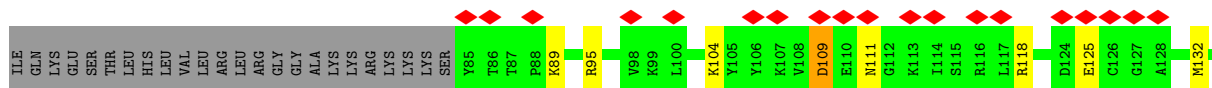
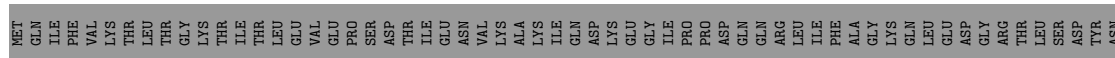
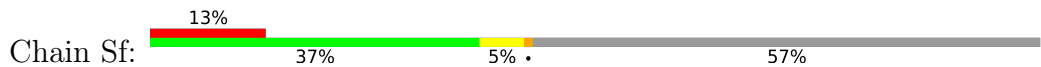
• Molecule 80: 40S ribosomal protein S27



• Molecule 81: 40S ribosomal protein S30



• Molecule 82: Ubiquitin-40S ribosomal protein S27a



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	98884	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION; cryoSPARC	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	44	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	2.263	Depositor
Minimum map value	-0.635	Depositor
Average map value	0.007	Depositor
Map value standard deviation	0.078	Depositor
Recommended contour level	0.2	Depositor
Map size (Å)	458.01, 458.01, 458.01	wwPDB
Map dimensions	630, 630, 630	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.727, 0.727, 0.727	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, 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	L5	0.33	0/89548	0.97	225/139613 (0.2%)
2	L7	0.29	0/2861	0.92	1/4459 (0.0%)
3	L8	0.30	0/3701	0.90	2/5766 (0.0%)
4	LA	0.33	0/1936	0.70	1/2596 (0.0%)
5	LB	0.29	0/3306	0.61	0/4424
6	LC	0.28	0/2981	0.63	0/4002
7	LD	0.30	0/2428	0.58	1/3252 (0.0%)
8	LE	0.27	0/1808	0.59	0/2425
9	LF	0.29	0/1905	0.59	0/2539
10	LG	0.31	0/1960	0.61	0/2637
11	LH	0.28	0/1537	0.60	0/2066
12	LI	0.31	0/1677	0.62	0/2237
13	LJ	0.29	0/1433	0.62	0/1915
14	LL	0.31	0/1732	0.64	0/2315
15	LM	0.28	0/1161	0.57	0/1554
16	LN	0.29	0/1746	0.65	1/2338 (0.0%)
17	LO	0.28	0/1682	0.57	0/2250
18	LP	0.26	0/1268	0.55	0/1701
19	LQ	0.28	0/1537	0.65	0/2052
20	LR	0.26	0/1582	0.59	0/2091
21	LS	0.28	0/1493	0.58	0/2003
22	LT	0.30	0/1326	0.60	1/1770 (0.1%)
23	LU	0.29	0/830	0.56	0/1114
24	LV	0.30	0/993	0.63	0/1332
25	LW	0.29	0/1030	0.60	0/1364
26	LX	0.28	0/1002	0.60	1/1345 (0.1%)
27	LY	0.27	0/1123	0.61	0/1493
28	LZ	0.31	0/1130	0.61	0/1507
29	La	0.27	0/1191	0.59	0/1591
30	Lb	0.31	0/895	0.59	0/1182
31	Lc	0.28	0/774	0.54	0/1038
32	Ld	0.26	0/903	0.60	0/1216

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	Le	0.28	0/1071	0.64	1/1429 (0.1%)
34	Lf	0.30	0/895	0.66	0/1198
35	Lg	0.26	0/916	0.60	0/1220
36	Lh	0.28	0/1023	0.58	0/1351
37	Li	0.27	0/843	0.61	0/1115
38	Lj	0.30	0/720	0.65	0/952
39	Lk	0.36	0/575	0.69	0/761
40	Ll	0.26	0/454	0.59	0/599
41	Lm	0.25	0/435	0.57	0/575
42	Ln	0.27	0/231	0.71	0/294
43	Lo	0.27	0/876	0.59	0/1156
44	Lp	0.27	0/718	0.58	0/953
45	Lr	0.27	0/1017	0.60	0/1364
46	Ls	0.29	0/1519	0.68	3/2052 (0.1%)
47	Lt	0.30	0/1058	0.74	3/1430 (0.2%)
48	Lz	0.24	0/1017	0.44	0/1416
49	S2	0.29	0/41241	0.93	80/64258 (0.1%)
50	SA	0.28	0/1778	0.55	0/2416
51	SB	0.27	0/1765	0.59	1/2362 (0.0%)
52	SD	0.30	0/1793	0.68	2/2414 (0.1%)
53	SE	0.27	0/2118	0.59	1/2849 (0.0%)
54	SF	0.29	0/1481	0.62	0/1988
55	SH	0.31	0/1519	0.69	1/2033 (0.0%)
56	SI	0.29	0/1715	0.61	0/2287
57	SK	0.41	0/823	0.77	2/1111 (0.2%)
58	SL	0.28	0/1202	0.57	0/1606
59	SP	0.33	0/1082	0.81	4/1446 (0.3%)
60	SQ	0.30	0/1160	0.71	0/1553
61	SR	0.31	0/1105	0.73	4/1484 (0.3%)
62	SS	0.37	0/1208	0.87	2/1618 (0.1%)
63	ST	0.34	0/1131	0.76	1/1515 (0.1%)
64	SU	0.35	0/831	0.75	0/1115
65	SV	0.27	0/643	0.56	0/860
66	SX	0.28	0/1116	0.57	0/1490
67	Sa	0.26	0/836	0.61	0/1121
68	Sc	0.28	0/508	0.74	0/680
69	Sd	0.43	0/470	0.65	0/623
70	Sg	0.31	0/2493	0.72	3/3394 (0.1%)
71	SC	0.29	0/1762	0.57	0/2381
72	SG	0.30	0/1946	0.71	1/2590 (0.0%)
73	SJ	0.27	0/1550	0.60	0/2069
74	SM	0.24	0/603	0.40	0/837
75	SN	0.26	0/1232	0.56	0/1656

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
76	SO	0.27	0/1023	0.61	0/1372
77	SW	0.27	0/1051	0.59	0/1406
78	SY	0.28	0/1044	0.60	0/1388
79	SZ	0.36	0/604	0.91	2/810 (0.2%)
80	Sb	0.29	0/665	0.57	0/891
81	Se	0.29	0/465	0.67	0/612
82	Sf	0.32	0/560	0.81	2/745 (0.3%)
All	All	0.31	0/234370	0.85	346/344032 (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
5	LB	0	1
22	LT	0	2
28	LZ	0	1
29	La	0	1
34	Lf	0	1
61	SR	0	1
70	Sg	0	1
79	SZ	0	1
All	All	0	9

There are no bond length outliers.

All (346) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L5	485	C	C2-N1-C1'	12.94	133.03	118.80
1	L5	4066	U	N3-C2-O2	-11.22	114.34	122.20
1	L5	4101	C	N3-C2-O2	-10.63	114.46	121.90
1	L5	1414	C	N3-C2-O2	-10.39	114.63	121.90
1	L5	3947	A	N1-C6-N6	-10.21	112.47	118.60
1	L5	4923	C	N3-C2-O2	-10.06	114.86	121.90
1	L5	1761	G	C5-C6-O6	9.93	134.56	128.60
1	L5	1414	C	N1-C2-O2	9.80	124.78	118.90
1	L5	485	C	C6-N1-C1'	-9.60	109.28	120.80
1	L5	1772	C	N3-C4-N4	-9.56	111.31	118.00
1	L5	4921	C	N3-C2-O2	-9.36	115.35	121.90
1	L5	4149	C	N3-C2-O2	-9.19	115.47	121.90
1	L5	4138	C	N3-C2-O2	-9.19	115.47	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L5	4516	G	N3-C2-N2	-9.05	113.56	119.90
1	L5	1761	G	N1-C6-O6	-8.83	114.60	119.90
82	Sf	109	ASP	CB-CG-OD1	8.80	126.22	118.30
49	S2	1453	C	C2-N1-C1'	8.66	128.33	118.80
1	L5	417	G	O4'-C1'-N9	8.49	114.99	108.20
1	L5	485	C	N1-C2-O2	8.31	123.88	118.90
49	S2	1453	C	N1-C2-O2	8.30	123.88	118.90
1	L5	1252	C	N3-C2-O2	-8.26	116.12	121.90
1	L5	4928	C	C2-N1-C1'	8.24	127.87	118.80
1	L5	4516	G	C5-C6-O6	8.22	133.53	128.60
1	L5	4709	U	C2-N1-C1'	7.95	127.23	117.70
49	S2	1309	C	C2-N1-C1'	7.95	127.54	118.80
1	L5	925	C	N3-C2-O2	-7.88	116.39	121.90
22	LT	38	ASP	CB-CG-OD1	7.86	125.37	118.30
55	SH	132	ASP	CB-CG-OD1	7.86	125.37	118.30
1	L5	4923	C	N1-C2-O2	7.85	123.61	118.90
1	L5	3947	A	C5-C6-N6	7.79	129.93	123.70
1	L5	2409	U	C2-N1-C1'	7.76	127.02	117.70
4	LA	122	ASP	CB-CG-OD1	7.65	125.18	118.30
49	S2	1271	C	N1-C2-O2	7.63	123.48	118.90
1	L5	4516	G	C4-C5-N7	-7.59	107.77	110.80
1	L5	925	C	N1-C2-O2	7.58	123.45	118.90
1	L5	4924	C	N3-C2-O2	-7.51	116.64	121.90
1	L5	2409	U	N1-C2-O2	7.51	128.06	122.80
1	L5	4557	U	N3-C2-O2	-7.44	116.99	122.20
1	L5	3947	A	N1-C2-N3	-7.41	125.60	129.30
49	S2	1261	C	N1-C2-O2	7.39	123.33	118.90
1	L5	4557	U	N1-C2-O2	7.38	127.97	122.80
49	S2	112	U	C2'-C3'-O3'	7.36	125.70	109.50
1	L5	2627	C	C2-N1-C1'	7.34	126.88	118.80
1	L5	4101	C	N1-C2-O2	7.28	123.27	118.90
1	L5	4557	U	C2-N1-C1'	7.25	126.39	117.70
1	L5	2409	U	N3-C2-O2	-7.24	117.13	122.20
1	L5	2902	G	C5-C6-O6	7.11	132.87	128.60
49	S2	583	C	N1-C2-O2	7.10	123.16	118.90
49	S2	1417	C	N3-C2-O2	-7.09	116.94	121.90
1	L5	3715	U	C2-N1-C1'	7.08	126.20	117.70
49	S2	1277	C	C2-N1-C1'	7.03	126.54	118.80
1	L5	5040	U	C5-C4-O4	-7.03	121.68	125.90
1	L5	1191	C	N3-C2-O2	-7.01	116.99	121.90
1	L5	3741	C	N3-C2-O2	-7.01	116.99	121.90
49	S2	1022	U	C2-N1-C1'	7.00	126.10	117.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
49	S2	291	G	C2'-C3'-O3'	7.00	124.89	113.70
1	L5	4758	U	C2-N1-C1'	6.99	126.09	117.70
59	SP	70	MET	CA-CB-CG	6.99	125.18	113.30
49	S2	1520	G	C4-N9-C1'	6.98	135.57	126.50
1	L5	4303	C	N3-C2-O2	-6.97	117.02	121.90
1	L5	4758	U	N1-C2-O2	6.97	127.68	122.80
1	L5	2410	C	C2-N1-C1'	6.96	126.46	118.80
1	L5	3757	G	O4'-C1'-N9	6.95	113.76	108.20
49	S2	1520	G	N3-C4-N9	6.92	130.15	126.00
1	L5	4516	G	N9-C4-C5	6.91	108.16	105.40
1	L5	2902	G	N1-C6-O6	-6.90	115.76	119.90
1	L5	4107	G	N3-C4-N9	6.88	130.13	126.00
1	L5	4281	A	C8-N9-C4	-6.87	103.05	105.80
1	L5	4928	C	N3-C2-O2	-6.86	117.10	121.90
57	SK	52	LEU	CA-CB-CG	6.85	131.06	115.30
49	S2	688	U	P-O3'-C3'	6.82	127.88	119.70
1	L5	485	C	C6-N1-C2	-6.80	117.58	120.30
49	S2	1261	C	C2-N1-C1'	6.76	126.23	118.80
1	L5	2262	G	C4-N9-C1'	6.74	135.26	126.50
1	L5	1245	C	C2-N1-C1'	6.74	126.21	118.80
1	L5	4928	C	N1-C2-O2	6.74	122.94	118.90
1	L5	4926	C	C2-N1-C1'	6.74	126.21	118.80
1	L5	3647	A	C5-C6-N1	6.71	121.06	117.70
1	L5	4709	U	C5-C4-O4	-6.70	121.88	125.90
1	L5	485	C	C5-C6-N1	6.67	124.34	121.00
61	SR	110	ASP	CB-CG-OD1	6.67	124.30	118.30
1	L5	1216	C	C2-N1-C1'	6.66	126.13	118.80
1	L5	4066	U	N1-C2-O2	6.65	127.45	122.80
1	L5	4516	G	N3-C4-N9	-6.62	122.03	126.00
49	S2	1271	C	C2-N1-C1'	6.61	126.06	118.80
1	L5	2255	C	C2-N1-C1'	6.60	126.06	118.80
1	L5	963	G	C4-N9-C1'	6.59	135.06	126.50
1	L5	1772	C	N3-C4-C5	6.56	124.52	121.90
49	S2	427	U	C2-N1-C1'	6.55	125.56	117.70
3	L8	128	C	C2-N1-C1'	6.52	125.97	118.80
1	L5	515	C	C2-N1-C1'	6.51	125.96	118.80
63	ST	110	LEU	CA-CB-CG	6.49	130.22	115.30
1	L5	2018	C	C5-C6-N1	6.48	124.24	121.00
1	L5	4758	U	N3-C2-O2	-6.48	117.67	122.20
1	L5	4926	C	N1-C2-O2	6.48	122.79	118.90
1	L5	4928	C	C6-N1-C2	-6.48	117.71	120.30
49	S2	1453	C	N3-C2-O2	-6.46	117.38	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L5	4107	G	C4-N9-C1'	6.46	134.89	126.50
52	SD	154	ASP	CB-CG-OD1	6.45	124.10	118.30
49	S2	1389	C	C2-N1-C1'	6.44	125.89	118.80
49	S2	1261	C	N3-C2-O2	-6.44	117.39	121.90
1	L5	515	C	N1-C2-O2	6.39	122.73	118.90
49	S2	1277	C	N1-C2-O2	6.39	122.74	118.90
79	SZ	44	LEU	CA-CB-CG	6.38	129.98	115.30
1	L5	2528	G	C4-N9-C1'	6.36	134.77	126.50
1	L5	77	U	N3-C2-O2	-6.35	117.75	122.20
1	L5	4303	C	C2-N1-C1'	6.33	125.76	118.80
1	L5	2262	G	N3-C4-C5	-6.31	125.45	128.60
1	L5	2760	G	P-O3'-C3'	6.31	127.27	119.70
1	L5	4101	C	C6-N1-C2	-6.30	117.78	120.30
1	L5	4516	G	N1-C6-O6	-6.26	116.15	119.90
1	L5	914	U	P-O3'-C3'	6.25	127.20	119.70
1	L5	2262	G	N3-C4-N9	6.24	129.74	126.00
1	L5	4926	C	O4'-C1'-N1	6.24	113.19	108.20
1	L5	3947	A	C6-N1-C2	6.24	122.34	118.60
1	L5	3715	U	N3-C2-O2	-6.23	117.84	122.20
1	L5	4303	C	N1-C2-O2	6.21	122.63	118.90
62	SS	89	ASP	CB-CG-OD1	6.21	123.89	118.30
49	S2	1342	U	N3-C2-O2	-6.20	117.86	122.20
1	L5	3909	C	C6-N1-C2	-6.20	117.82	120.30
1	L5	4303	C	C6-N1-C2	-6.19	117.83	120.30
1	L5	3647	A	C6-N1-C2	-6.18	114.89	118.60
1	L5	2675	G	P-O3'-C3'	6.18	127.11	119.70
49	S2	1520	G	N3-C4-C5	-6.17	125.51	128.60
1	L5	963	G	N3-C4-N9	6.17	129.70	126.00
49	S2	539	C	C2-N1-C1'	6.16	125.57	118.80
47	Lt	37	LEU	CA-CB-CG	6.15	129.45	115.30
1	L5	1251	C	N1-C2-O2	6.15	122.59	118.90
1	L5	184	U	C2-N1-C1'	6.14	125.07	117.70
1	L5	184	U	N1-C2-O2	6.14	127.10	122.80
49	S2	530	U	C2-N1-C1'	6.14	125.06	117.70
1	L5	4773	C	N1-C2-O2	6.13	122.58	118.90
1	L5	2528	G	N3-C4-C5	-6.12	125.54	128.60
1	L5	218	A	P-O3'-C3'	6.12	127.04	119.70
1	L5	1182	C	N1-C2-O2	6.12	122.57	118.90
1	L5	2255	C	N1-C2-O2	6.12	122.57	118.90
1	L5	3741	C	N1-C2-O2	6.08	122.55	118.90
49	S2	1597	C	N1-C2-O2	6.07	122.54	118.90
1	L5	963	G	N3-C4-C5	-6.07	125.57	128.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
49	S2	1520	G	C8-N9-C1'	-6.06	119.12	127.00
1	L5	3778	U	N1-C2-O2	6.04	127.03	122.80
33	Le	89	LEU	CA-CB-CG	6.01	129.13	115.30
1	L5	1182	C	C2-N1-C1'	6.01	125.41	118.80
49	S2	1453	C	C6-N1-C2	-5.99	117.91	120.30
49	S2	427	U	N3-C2-O2	-5.99	118.01	122.20
7	LD	163	LEU	CA-CB-CG	5.98	129.05	115.30
1	L5	2627	C	N1-C2-O2	5.98	122.49	118.90
51	SB	62	LEU	CA-CB-CG	5.97	129.04	115.30
1	L5	220	C	C2-N1-C1'	5.97	125.36	118.80
1	L5	234	G	O4'-C1'-N9	5.96	112.97	108.20
1	L5	453	G	N3-C4-C5	-5.96	125.62	128.60
49	S2	1309	C	C5-C6-N1	5.95	123.97	121.00
1	L5	1417	C	C2-N1-C1'	5.93	125.33	118.80
49	S2	1271	C	N3-C2-O2	-5.93	117.75	121.90
49	S2	130	G	C4-N9-C1'	5.92	134.20	126.50
61	SR	73	LEU	CA-CB-CG	5.92	128.92	115.30
1	L5	209	U	C2-N1-C1'	5.91	124.79	117.70
1	L5	4138	C	N1-C2-O2	5.90	122.44	118.90
1	L5	4107	G	N3-C2-N2	5.90	124.03	119.90
1	L5	4229	U	N3-C2-O2	-5.89	118.08	122.20
1	L5	4921	C	N1-C2-O2	5.88	122.43	118.90
49	S2	1750	C	N1-C2-O2	5.88	122.43	118.90
1	L5	453	G	C4-N9-C1'	5.87	134.13	126.50
1	L5	4107	G	C8-N9-C1'	-5.87	119.37	127.00
49	S2	1309	C	N1-C2-O2	5.87	122.42	118.90
49	S2	1453	C	C6-N1-C1'	-5.86	113.77	120.80
1	L5	2033	A	P-O3'-C3'	5.85	126.72	119.70
1	L5	4149	C	C6-N1-C2	-5.83	117.97	120.30
70	Sg	5	MET	CB-CG-SD	5.83	129.89	112.40
70	Sg	131	LEU	CA-CB-CG	5.81	128.67	115.30
49	S2	1597	C	N3-C2-O2	-5.81	117.83	121.90
61	SR	27	ASP	CB-CG-OD1	5.81	123.53	118.30
1	L5	4709	U	C6-N1-C1'	-5.81	113.07	121.20
1	L5	4476	C	C2-N1-C1'	5.79	125.17	118.80
1	L5	4920	C	N1-C2-O2	5.77	122.36	118.90
49	S2	1261	C	C6-N1-C2	-5.75	118.00	120.30
1	L5	3598	C	C2-N1-C1'	5.74	125.11	118.80
49	S2	530	U	N1-C2-O2	5.72	126.81	122.80
79	SZ	83	LEU	CB-CG-CD1	-5.71	101.29	111.00
49	S2	1277	C	C6-N1-C1'	-5.71	113.95	120.80
49	S2	427	U	N1-C2-O2	5.70	126.79	122.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L5	234	G	C4-N9-C1'	5.70	133.91	126.50
1	L5	1762	C	N1-C2-O2	5.69	122.31	118.90
1	L5	1404	G	N1-C2-N2	-5.68	111.08	116.20
1	L5	2819	U	N3-C2-O2	-5.68	118.22	122.20
49	S2	1022	U	N1-C2-O2	5.68	126.78	122.80
1	L5	4149	C	N1-C2-O2	5.67	122.30	118.90
1	L5	453	G	N3-C4-N9	5.66	129.40	126.00
26	LX	116	LEU	CA-CB-CG	5.66	128.32	115.30
49	S2	1306	U	C2-N1-C1'	5.65	124.48	117.70
1	L5	184	U	N3-C2-O2	-5.63	118.26	122.20
49	S2	1309	C	C6-N1-C1'	-5.63	114.05	120.80
1	L5	963	G	C8-N9-C1'	-5.63	119.69	127.00
46	Ls	177	MET	CA-CB-CG	5.63	122.87	113.30
1	L5	4926	C	C6-N1-C2	-5.62	118.05	120.30
49	S2	659	G	C4-N9-C1'	5.62	133.80	126.50
1	L5	4137	C	N1-C2-O2	5.61	122.27	118.90
1	L5	2667	C	N1-C2-O2	5.60	122.26	118.90
1	L5	2262	G	C8-N9-C1'	-5.59	119.73	127.00
1	L5	3715	U	N1-C2-O2	5.59	126.71	122.80
49	S2	178	C	N1-C2-O2	5.59	122.25	118.90
1	L5	4138	C	C6-N1-C2	-5.59	118.06	120.30
49	S2	1660	C	C2-N1-C1'	5.59	124.94	118.80
72	SG	227	GLN	CA-CB-CG	5.58	125.68	113.40
1	L5	4926	C	N3-C2-O2	-5.58	118.00	121.90
1	L5	2094	G	C4-N9-C1'	5.56	133.73	126.50
1	L5	4913	G	P-O3'-C3'	5.55	126.36	119.70
1	L5	472	C	C2-N1-C1'	5.54	124.90	118.80
49	S2	130	G	N3-C4-C5	-5.54	125.83	128.60
1	L5	4923	C	C6-N1-C2	-5.54	118.08	120.30
3	L8	128	C	C5-C6-N1	5.54	123.77	121.00
57	SK	33	PRO	CA-N-CD	-5.54	103.75	111.50
1	L5	516	C	N1-C2-O2	5.53	122.22	118.90
49	S2	583	C	N3-C2-O2	-5.53	118.03	121.90
49	S2	530	U	N3-C2-O2	-5.51	118.34	122.20
1	L5	77	U	N1-C2-O2	5.50	126.65	122.80
52	SD	14	ASP	CB-CG-OD1	5.50	123.25	118.30
61	SR	24	LEU	CA-CB-CG	5.50	127.94	115.30
49	S2	1453	C	C5-C6-N1	5.50	123.75	121.00
1	L5	3772	U	C2-N1-C1'	5.49	124.29	117.70
53	SE	139	LEU	CA-CB-CG	5.49	127.93	115.30
1	L5	4133	C	C2-N1-C1'	5.49	124.84	118.80
1	L5	485	C	N3-C2-O2	-5.48	118.06	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L5	4066	U	N1-C2-N3	5.47	118.19	114.90
49	S2	310	C	C2-N1-C1'	5.47	124.82	118.80
49	S2	583	C	C2-N1-C1'	5.47	124.82	118.80
1	L5	2627	C	C6-N1-C2	-5.46	118.12	120.30
1	L5	1632	A	C2-N3-C4	5.45	113.32	110.60
49	S2	1389	C	N1-C2-O2	5.45	122.17	118.90
49	S2	833	C	N1-C2-O2	5.44	122.17	118.90
1	L5	2303	C	N3-C2-O2	-5.44	118.09	121.90
1	L5	4476	C	N1-C2-O2	5.44	122.17	118.90
1	L5	1977	C	P-O3'-C3'	5.43	126.21	119.70
1	L5	4399	U	N3-C2-O2	-5.42	118.41	122.20
49	S2	325	C	C2-N1-C1'	5.41	124.75	118.80
1	L5	1552	G	O4'-C1'-N9	5.41	112.53	108.20
1	L5	2528	G	N3-C4-N9	5.41	129.25	126.00
49	S2	340	C	N1-C2-O2	5.41	122.14	118.90
1	L5	4924	C	N1-C2-O2	5.41	122.14	118.90
2	L7	29	C	C2-N1-C1'	5.41	124.75	118.80
1	L5	1762	C	C2-N1-C1'	5.40	124.74	118.80
49	S2	4	C	C2-N1-C1'	5.36	124.70	118.80
49	S2	1434	C	P-O3'-C3'	5.36	126.13	119.70
49	S2	1660	C	N1-C2-O2	5.36	122.11	118.90
1	L5	1762	C	C6-N1-C2	-5.36	118.16	120.30
1	L5	4572	U	C2-N1-C1'	5.36	124.13	117.70
1	L5	971	U	C2-N1-C1'	5.35	124.12	117.70
1	L5	1472	C	C2-N1-C1'	5.35	124.69	118.80
1	L5	4775	C	C2-N1-C1'	5.35	124.69	118.80
1	L5	4928	C	C6-N1-C1'	-5.34	114.39	120.80
46	Ls	15	LEU	CA-CB-CG	5.34	127.58	115.30
59	SP	22	LEU	CA-CB-CG	5.33	127.57	115.30
49	S2	833	C	N3-C2-O2	-5.33	118.17	121.90
1	L5	4708	A	N7-C8-N9	5.32	116.46	113.80
1	L5	661	C	N3-C2-O2	-5.32	118.17	121.90
1	L5	1252	C	C6-N1-C2	-5.31	118.17	120.30
49	S2	1483	A	N1-C6-N6	-5.31	115.41	118.60
1	L5	2786	C	P-O3'-C3'	5.31	126.07	119.70
1	L5	112	C	C2-N1-C1'	5.31	124.64	118.80
70	Sg	118	ARG	CA-CB-CG	5.31	125.08	113.40
1	L5	5016	A	O4'-C1'-N9	5.30	112.44	108.20
1	L5	4714	C	N1-C2-O2	5.29	122.08	118.90
49	S2	130	G	N3-C4-N9	5.29	129.18	126.00
1	L5	4107	G	N3-C4-C5	-5.29	125.95	128.60
1	L5	4450	U	N3-C2-O2	-5.29	118.50	122.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
49	S2	1022	U	N3-C2-O2	-5.28	118.50	122.20
1	L5	2416	G	P-O3'-C3'	5.28	126.04	119.70
49	S2	1417	C	C6-N1-C2	-5.28	118.19	120.30
1	L5	3636	C	C6-N1-C2	-5.27	118.19	120.30
1	L5	4945	G	C5-C6-O6	-5.27	125.44	128.60
47	Lt	35	LEU	CA-CB-CG	5.27	127.41	115.30
1	L5	41	C	C5-C6-N1	5.26	123.63	121.00
1	L5	2410	C	C5-C6-N1	5.26	123.63	121.00
1	L5	1816	C	C6-N1-C2	-5.25	118.20	120.30
62	SS	21	ASP	CB-CG-OD1	5.24	123.02	118.30
1	L5	2011	C	N1-C2-O2	5.24	122.04	118.90
82	Sf	146	LEU	CA-CB-CG	5.24	127.34	115.30
1	L5	1216	C	N1-C2-O2	5.23	122.04	118.90
1	L5	4461	C	C6-N1-C2	-5.22	118.21	120.30
49	S2	1591	C	N1-C2-O2	5.22	122.03	118.90
1	L5	3673	C	P-O3'-C3'	5.22	125.96	119.70
1	L5	3909	C	N3-C2-O2	-5.21	118.25	121.90
49	S2	750	C	C6-N1-C2	-5.21	118.22	120.30
1	L5	2563	C	N1-C2-O2	5.20	122.02	118.90
1	L5	4901	G	N1-C6-O6	-5.20	116.78	119.90
1	L5	1182	C	N3-C2-O2	-5.20	118.26	121.90
49	S2	188	C	C2-N1-C1'	5.19	124.51	118.80
1	L5	4399	U	N1-C2-O2	5.19	126.43	122.80
1	L5	2409	U	C6-N1-C1'	-5.19	113.94	121.20
1	L5	3775	A	O4'-C1'-N9	5.19	112.35	108.20
49	S2	632	C	C2-N1-C1'	5.19	124.51	118.80
1	L5	4404	U	O4'-C1'-N1	5.18	112.35	108.20
49	S2	579	C	N1-C2-O2	5.18	122.01	118.90
1	L5	2018	C	C6-N1-C2	-5.18	118.23	120.30
1	L5	1853	G	C4-N9-C1'	5.17	133.22	126.50
1	L5	4461	C	N3-C2-O2	-5.17	118.28	121.90
1	L5	4773	C	C2-N1-C1'	5.16	124.48	118.80
1	L5	1762	C	N3-C2-O2	-5.16	118.29	121.90
1	L5	205	C	N3-C2-O2	-5.16	118.29	121.90
1	L5	4921	C	C6-N1-C2	-5.16	118.24	120.30
1	L5	1403	G	N3-C4-N9	5.15	129.09	126.00
1	L5	2094	G	N3-C4-C5	-5.15	126.03	128.60
1	L5	1809	C	C2-N1-C1'	5.15	124.46	118.80
1	L5	3767	C	N1-C2-O2	5.15	121.99	118.90
1	L5	1772	C	C5-C4-N4	5.14	123.80	120.20
49	S2	1342	U	N1-C2-N3	5.12	117.97	114.90
49	S2	1416	C	N1-C2-O2	5.12	121.97	118.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
49	S2	4	C	C6-N1-C2	-5.12	118.25	120.30
1	L5	1191	C	N1-C2-O2	5.12	121.97	118.90
1	L5	4708	A	C4-N9-C1'	5.12	135.51	126.30
1	L5	4229	U	N1-C2-O2	5.12	126.38	122.80
1	L5	4747	C	C2-N1-C1'	5.11	124.42	118.80
1	L5	406	C	P-O3'-C3'	5.10	125.82	119.70
1	L5	1251	C	N3-C2-O2	-5.10	118.33	121.90
1	L5	1417	C	N1-C2-O2	5.10	121.96	118.90
1	L5	4314	C	N1-C2-O2	5.10	121.96	118.90
1	L5	4502	C	N1-C2-O2	5.09	121.96	118.90
47	Lt	116	MET	CA-CB-CG	5.09	121.96	113.30
49	S2	1271	C	C6-N1-C2	-5.09	118.27	120.30
1	L5	2351	C	C6-N1-C2	-5.08	118.27	120.30
49	S2	49	C	N3-C2-O2	-5.08	118.34	121.90
1	L5	4516	G	C6-C5-N7	5.08	133.45	130.40
49	S2	1219	C	N1-C2-O2	5.08	121.94	118.90
49	S2	325	C	N1-C2-O2	5.07	121.94	118.90
1	L5	1633	G	P-O3'-C3'	5.07	125.78	119.70
1	L5	2255	C	N3-C2-O2	-5.06	118.36	121.90
1	L5	3771	C	C2-N1-C1'	5.06	124.37	118.80
49	S2	1683	C	N1-C2-O2	5.06	121.94	118.90
1	L5	4764	A	C6-N1-C2	5.05	121.63	118.60
46	Ls	40	MET	CA-CB-CG	5.05	121.88	113.30
59	SP	107	ILE	C-N-CA	5.04	134.31	121.70
49	S2	201	C	N1-C2-O2	5.04	121.92	118.90
1	L5	4920	C	N3-C2-O2	-5.04	118.37	121.90
1	L5	3636	C	N3-C2-O2	-5.04	118.38	121.90
59	SP	70	MET	CB-CG-SD	5.04	127.51	112.40
1	L5	1259	G	N1-C6-O6	-5.03	116.88	119.90
1	L5	4241	C	C2-N1-C1'	5.03	124.33	118.80
1	L5	5035	U	N3-C2-O2	-5.03	118.68	122.20
16	LN	134	LEU	CA-CB-CG	5.03	126.87	115.30
49	S2	1590	C	N1-C2-O2	5.03	121.92	118.90
1	L5	2281	U	C5-C6-N1	5.02	125.21	122.70
1	L5	4147	G	C5-C6-O6	5.02	131.61	128.60
49	S2	1750	C	N3-C2-O2	-5.02	118.39	121.90
1	L5	3778	U	N3-C2-O2	-5.01	118.69	122.20
1	L5	4887	C	N1-C2-O2	5.01	121.91	118.90
1	L5	201	C	C2-N1-C1'	5.00	124.31	118.80

There are no chirality outliers.

All (9) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
5	LB	303	ALA	Peptide
22	LT	25	VAL	Mainchain
22	LT	80	VAL	Peptide
28	LZ	124	THR	Peptide
29	La	22	ILE	Peptide
34	Lf	79	GLY	Peptide
61	SR	124	VAL	Peptide
79	SZ	78	LYS	Peptide
70	Sg	178	ASN	Peptide

5.2 Too-close contacts [i](#)

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

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	LA	246/257 (96%)	229 (93%)	17 (7%)	0	100	100
5	LB	400/403 (99%)	382 (96%)	16 (4%)	2 (0%)	29	31
6	LC	366/427 (86%)	345 (94%)	21 (6%)	0	100	100
7	LD	291/297 (98%)	281 (97%)	10 (3%)	0	100	100
8	LE	215/288 (75%)	195 (91%)	20 (9%)	0	100	100
9	LF	223/248 (90%)	216 (97%)	7 (3%)	0	100	100
10	LG	239/266 (90%)	226 (95%)	13 (5%)	0	100	100
11	LH	188/192 (98%)	172 (92%)	16 (8%)	0	100	100
12	LI	198/214 (92%)	192 (97%)	5 (2%)	1 (0%)	29	31
13	LJ	174/178 (98%)	166 (95%)	8 (5%)	0	100	100
14	LL	208/211 (99%)	196 (94%)	11 (5%)	1 (0%)	29	31
15	LM	137/215 (64%)	130 (95%)	7 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
16	LN	201/204 (98%)	192 (96%)	7 (4%)	2 (1%)	15	14
17	LO	199/203 (98%)	196 (98%)	2 (1%)	1 (0%)	29	31
18	LP	151/184 (82%)	145 (96%)	6 (4%)	0	100	100
19	LQ	185/188 (98%)	179 (97%)	6 (3%)	0	100	100
20	LR	185/196 (94%)	182 (98%)	3 (2%)	0	100	100
21	LS	173/176 (98%)	166 (96%)	7 (4%)	0	100	100
22	LT	157/160 (98%)	153 (98%)	4 (2%)	0	100	100
23	LU	98/128 (77%)	95 (97%)	3 (3%)	0	100	100
24	LV	129/140 (92%)	124 (96%)	5 (4%)	0	100	100
25	LW	122/157 (78%)	116 (95%)	6 (5%)	0	100	100
26	LX	118/156 (76%)	116 (98%)	2 (2%)	0	100	100
27	LY	131/145 (90%)	129 (98%)	2 (2%)	0	100	100
28	LZ	133/136 (98%)	129 (97%)	4 (3%)	0	100	100
29	La	145/148 (98%)	138 (95%)	7 (5%)	0	100	100
30	Lb	105/159 (66%)	98 (93%)	7 (7%)	0	100	100
31	Lc	96/115 (84%)	93 (97%)	3 (3%)	0	100	100
32	Ld	105/125 (84%)	101 (96%)	4 (4%)	0	100	100
33	Le	126/135 (93%)	124 (98%)	2 (2%)	0	100	100
34	Lf	107/110 (97%)	99 (92%)	8 (8%)	0	100	100
35	Lg	112/117 (96%)	111 (99%)	1 (1%)	0	100	100
36	Lh	120/123 (98%)	119 (99%)	1 (1%)	0	100	100
37	Li	100/105 (95%)	99 (99%)	1 (1%)	0	100	100
38	Lj	84/97 (87%)	79 (94%)	5 (6%)	0	100	100
39	Lk	67/70 (96%)	63 (94%)	4 (6%)	0	100	100
40	Ll	48/51 (94%)	48 (100%)	0	0	100	100
41	Lm	50/128 (39%)	50 (100%)	0	0	100	100
42	Ln	22/25 (88%)	22 (100%)	0	0	100	100
43	Lo	103/106 (97%)	97 (94%)	6 (6%)	0	100	100
44	Lp	89/92 (97%)	85 (96%)	4 (4%)	0	100	100
45	Lr	123/137 (90%)	119 (97%)	4 (3%)	0	100	100
46	Ls	194/317 (61%)	179 (92%)	15 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
47	Lt	137/165 (83%)	108 (79%)	29 (21%)	0	100	100
48	Lz	203/217 (94%)	184 (91%)	19 (9%)	0	100	100
50	SA	219/295 (74%)	210 (96%)	9 (4%)	0	100	100
51	SB	212/264 (80%)	204 (96%)	8 (4%)	0	100	100
52	SD	225/243 (93%)	204 (91%)	21 (9%)	0	100	100
53	SE	260/263 (99%)	247 (95%)	13 (5%)	0	100	100
54	SF	180/204 (88%)	169 (94%)	10 (6%)	1 (1%)	25	26
55	SH	182/194 (94%)	173 (95%)	9 (5%)	0	100	100
56	SI	204/208 (98%)	199 (98%)	5 (2%)	0	100	100
57	SK	93/165 (56%)	84 (90%)	8 (9%)	1 (1%)	14	12
58	SL	140/158 (89%)	133 (95%)	7 (5%)	0	100	100
59	SP	127/145 (88%)	120 (94%)	7 (6%)	0	100	100
60	SQ	142/146 (97%)	125 (88%)	17 (12%)	0	100	100
61	SR	133/135 (98%)	124 (93%)	9 (7%)	0	100	100
62	SS	142/152 (93%)	132 (93%)	10 (7%)	0	100	100
63	ST	141/145 (97%)	133 (94%)	8 (6%)	0	100	100
64	SU	102/119 (86%)	94 (92%)	8 (8%)	0	100	100
65	SV	81/83 (98%)	80 (99%)	1 (1%)	0	100	100
66	SX	139/143 (97%)	134 (96%)	4 (3%)	1 (1%)	22	22
67	Sa	100/115 (87%)	94 (94%)	6 (6%)	0	100	100
68	Sc	62/69 (90%)	60 (97%)	2 (3%)	0	100	100
69	Sd	53/56 (95%)	50 (94%)	3 (6%)	0	100	100
70	Sg	311/317 (98%)	271 (87%)	40 (13%)	0	100	100
71	SC	220/293 (75%)	211 (96%)	9 (4%)	0	100	100
72	SG	235/249 (94%)	223 (95%)	12 (5%)	0	100	100
73	SJ	183/194 (94%)	176 (96%)	6 (3%)	1 (0%)	29	31
74	SM	120/132 (91%)	114 (95%)	6 (5%)	0	100	100
75	SN	148/151 (98%)	146 (99%)	2 (1%)	0	100	100
76	SO	133/151 (88%)	127 (96%)	5 (4%)	1 (1%)	19	19
77	SW	127/130 (98%)	122 (96%)	5 (4%)	0	100	100
78	SY	124/133 (93%)	120 (97%)	4 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
79	SZ	73/125 (58%)	62 (85%)	10 (14%)	1 (1%)	11	8
80	Sb	81/84 (96%)	76 (94%)	5 (6%)	0	100	100
81	Se	56/59 (95%)	50 (89%)	6 (11%)	0	100	100
82	Sf	65/156 (42%)	56 (86%)	9 (14%)	0	100	100
All	All	11816/13387 (88%)	11191 (95%)	612 (5%)	13 (0%)	54	60

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
12	LI	213	HIS
16	LN	124	ASP
57	SK	2	LEU
79	SZ	45	ASN
5	LB	360	LEU
17	LO	202	LEU
76	SO	140	THR
5	LB	302	ASN
14	LL	136	LYS
54	SF	128	ILE
66	SX	124	LYS
73	SJ	122	SER
16	LN	83	LYS

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	LA	190/199 (96%)	184 (97%)	6 (3%)	39	50
5	LB	348/349 (100%)	341 (98%)	7 (2%)	55	69
6	LC	306/348 (88%)	293 (96%)	13 (4%)	30	38
7	LD	246/250 (98%)	234 (95%)	12 (5%)	25	31
8	LE	195/252 (77%)	189 (97%)	6 (3%)	40	51

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	LF	194/215 (90%)	187 (96%)	7 (4%)	35	45
10	LG	203/223 (91%)	189 (93%)	14 (7%)	15	16
11	LH	169/171 (99%)	165 (98%)	4 (2%)	49	62
12	LI	172/181 (95%)	163 (95%)	9 (5%)	23	28
13	LJ	148/149 (99%)	140 (95%)	8 (5%)	22	26
14	LL	176/177 (99%)	168 (96%)	8 (4%)	27	34
15	LM	118/161 (73%)	116 (98%)	2 (2%)	60	74
16	LN	171/172 (99%)	164 (96%)	7 (4%)	30	39
17	LO	173/174 (99%)	165 (95%)	8 (5%)	27	34
18	LP	134/163 (82%)	134 (100%)	0	100	100
19	LQ	164/165 (99%)	163 (99%)	1 (1%)	86	93
20	LR	166/175 (95%)	160 (96%)	6 (4%)	35	45
21	LS	156/157 (99%)	151 (97%)	5 (3%)	39	50
22	LT	139/140 (99%)	133 (96%)	6 (4%)	29	36
23	LU	90/115 (78%)	81 (90%)	9 (10%)	7	7
24	LV	101/107 (94%)	100 (99%)	1 (1%)	76	86
25	LW	103/126 (82%)	99 (96%)	4 (4%)	32	41
26	LX	108/133 (81%)	105 (97%)	3 (3%)	43	56
27	LY	123/135 (91%)	115 (94%)	8 (6%)	17	19
28	LZ	117/118 (99%)	113 (97%)	4 (3%)	37	47
29	La	120/121 (99%)	119 (99%)	1 (1%)	81	90
30	Lb	89/126 (71%)	78 (88%)	11 (12%)	4	4
31	Lc	83/97 (86%)	81 (98%)	2 (2%)	49	62
32	Ld	98/110 (89%)	95 (97%)	3 (3%)	40	51
33	Le	114/121 (94%)	112 (98%)	2 (2%)	59	72
34	Lf	88/89 (99%)	84 (96%)	4 (4%)	27	34
35	Lg	98/100 (98%)	96 (98%)	2 (2%)	55	69
36	Lh	109/110 (99%)	101 (93%)	8 (7%)	14	15
37	Li	86/89 (97%)	81 (94%)	5 (6%)	20	23
38	Lj	73/80 (91%)	69 (94%)	4 (6%)	21	26
39	Lk	64/65 (98%)	62 (97%)	2 (3%)	40	51

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
40	Ll	47/48 (98%)	47 (100%)	0	100	100
41	Lm	48/116 (41%)	47 (98%)	1 (2%)	53	67
42	Ln	23/24 (96%)	22 (96%)	1 (4%)	29	36
43	Lo	93/94 (99%)	90 (97%)	3 (3%)	39	50
44	Lp	74/75 (99%)	71 (96%)	3 (4%)	30	39
45	Lr	109/121 (90%)	106 (97%)	3 (3%)	43	56
46	Ls	162/258 (63%)	157 (97%)	5 (3%)	40	51
47	Lt	112/137 (82%)	108 (96%)	4 (4%)	35	45
50	SA	183/243 (75%)	172 (94%)	11 (6%)	19	22
51	SB	195/231 (84%)	184 (94%)	11 (6%)	21	25
52	SD	190/202 (94%)	176 (93%)	14 (7%)	13	14
53	SE	224/225 (100%)	220 (98%)	4 (2%)	59	72
54	SF	156/170 (92%)	144 (92%)	12 (8%)	13	13
55	SH	166/174 (95%)	156 (94%)	10 (6%)	19	22
56	SI	178/180 (99%)	169 (95%)	9 (5%)	24	29
57	SK	86/136 (63%)	76 (88%)	10 (12%)	5	5
58	SL	130/142 (92%)	126 (97%)	4 (3%)	40	51
59	SP	115/130 (88%)	102 (89%)	13 (11%)	6	5
60	SQ	119/121 (98%)	110 (92%)	9 (8%)	13	14
61	SR	122/122 (100%)	114 (93%)	8 (7%)	16	19
62	SS	125/132 (95%)	114 (91%)	11 (9%)	10	10
63	ST	113/115 (98%)	104 (92%)	9 (8%)	12	12
64	SU	94/107 (88%)	83 (88%)	11 (12%)	5	4
65	SV	67/67 (100%)	66 (98%)	1 (2%)	65	78
66	SX	113/115 (98%)	105 (93%)	8 (7%)	14	16
67	Sa	89/98 (91%)	87 (98%)	2 (2%)	52	65
68	Sc	57/62 (92%)	52 (91%)	5 (9%)	10	10
69	Sd	48/49 (98%)	44 (92%)	4 (8%)	11	11
70	Sg	272/275 (99%)	247 (91%)	25 (9%)	9	9
71	SC	188/225 (84%)	179 (95%)	9 (5%)	25	32
72	SG	207/218 (95%)	194 (94%)	13 (6%)	18	20

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
73	SJ	161/168 (96%)	156 (97%)	5 (3%)	40	51
75	SN	130/131 (99%)	124 (95%)	6 (5%)	27	34
76	SO	105/119 (88%)	99 (94%)	6 (6%)	20	24
77	SW	112/113 (99%)	109 (97%)	3 (3%)	44	57
78	SY	109/115 (95%)	101 (93%)	8 (7%)	14	15
79	SZ	66/103 (64%)	59 (89%)	7 (11%)	6	6
80	Sb	75/76 (99%)	70 (93%)	5 (7%)	16	18
81	Se	47/48 (98%)	43 (92%)	4 (8%)	10	10
82	Sf	60/140 (43%)	50 (83%)	10 (17%)	2	1
All	All	10002/11088 (90%)	9513 (95%)	489 (5%)	29	31

All (489) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	LA	15	VAL
4	LA	28	ARG
4	LA	47	ASP
4	LA	159	SER
4	LA	208	GLU
4	LA	221	LYS
5	LB	2	SER
5	LB	208	ASN
5	LB	297	LYS
5	LB	300	LYS
5	LB	325	GLU
5	LB	337	VAL
5	LB	343	ARG
6	LC	3	CYS
6	LC	8	ILE
6	LC	24	LEU
6	LC	65	GLU
6	LC	66	SER
6	LC	122	TYR
6	LC	140	LYS
6	LC	204	ARG
6	LC	234	LYS
6	LC	257	PHE
6	LC	294	LYS
6	LC	311	ARG

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Mol	Chain	Res	Type
6	LC	334	THR
7	LD	43	LYS
7	LD	86	TYR
7	LD	109	LEU
7	LD	128	ASP
7	LD	136	ASP
7	LD	196	ARG
7	LD	215	ASP
7	LD	220	LYS
7	LD	224	SER
7	LD	239	MET
7	LD	265	ARG
7	LD	272	SER
8	LE	100	LYS
8	LE	120	ASP
8	LE	127	SER
8	LE	138	ARG
8	LE	210	LYS
8	LE	273	SER
9	LF	28	LEU
9	LF	43	ARG
9	LF	63	GLN
9	LF	84	PRO
9	LF	171	ASP
9	LF	200	ARG
9	LF	238	ASP
10	LG	33	GLU
10	LG	38	ASN
10	LG	43	GLN
10	LG	88	ASP
10	LG	162	ASP
10	LG	175	ARG
10	LG	179	VAL
10	LG	198	THR
10	LG	201	THR
10	LG	206	GLN
10	LG	207	VAL
10	LG	220	GLU
10	LG	224	THR
10	LG	232	GLU
11	LH	52	LYS
11	LH	143	GLU

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Mol	Chain	Res	Type
11	LH	146	LEU
11	LH	161	ILE
12	LI	32	ARG
12	LI	74	LYS
12	LI	79	SER
12	LI	121	LYS
12	LI	123	GLN
12	LI	146	GLU
12	LI	169	LYS
12	LI	195	CYS
12	LI	197	VAL
13	LJ	16	ARG
13	LJ	47	THR
13	LJ	64	ARG
13	LJ	68	ILE
13	LJ	129	ASP
13	LJ	132	VAL
13	LJ	150	CYS
13	LJ	169	LYS
14	LL	59	VAL
14	LL	67	HIS
14	LL	97	SER
14	LL	109	SER
14	LL	122	SER
14	LL	164	GLU
14	LL	204	GLU
14	LL	207	VAL
15	LM	28	VAL
15	LM	79	LYS
16	LN	20	ARG
16	LN	67	ARG
16	LN	108	ARG
16	LN	124	ASP
16	LN	153	LYS
16	LN	166	SER
16	LN	171	SER
17	LO	27	VAL
17	LO	92	THR
17	LO	116	LYS
17	LO	117	ARG
17	LO	145	VAL
17	LO	159	LYS

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Mol	Chain	Res	Type
17	LO	173	GLN
17	LO	179	LYS
19	LQ	160	HIS
20	LR	108	ARG
20	LR	111	GLU
20	LR	117	ARG
20	LR	144	LYS
20	LR	170	ARG
20	LR	174	GLU
21	LS	48	VAL
21	LS	49	SER
21	LS	70	LYS
21	LS	76	LYS
21	LS	161	ARG
22	LT	36	LYS
22	LT	76	VAL
22	LT	83	LYS
22	LT	99	SER
22	LT	130	ARG
22	LT	159	MET
23	LU	19	LEU
23	LU	25	CYS
23	LU	66	SER
23	LU	74	SER
23	LU	93	LYS
23	LU	97	ARG
23	LU	98	ASP
23	LU	107	LYS
23	LU	113	ARG
24	LV	48	ARG
25	LW	1	MET
25	LW	44	ARG
25	LW	77	LYS
25	LW	102	LYS
26	LX	67	ARG
26	LX	120	ASP
26	LX	147	LEU
27	LY	40	GLN
27	LY	44	VAL
27	LY	46	SER
27	LY	74	TYR
27	LY	79	VAL

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Mol	Chain	Res	Type
27	LY	99	ILE
27	LY	124	LYS
27	LY	126	ARG
28	LZ	93	LYS
28	LZ	102	ARG
28	LZ	112	ARG
28	LZ	132	GLN
29	La	106	SER
30	Lb	5	LYS
30	Lb	14	ARG
30	Lb	51	LYS
30	Lb	68	ARG
30	Lb	76	VAL
30	Lb	103	LYS
30	Lb	106	LYS
30	Lb	111	ARG
30	Lb	114	LYS
30	Lb	117	ARG
30	Lb	118	LEU
31	Lc	17	ARG
31	Lc	92	CYS
32	Ld	70	LYS
32	Ld	89	SER
32	Ld	95	ASP
33	Le	33	ARG
33	Le	45	VAL
34	Lf	8	LYS
34	Lf	46	ARG
34	Lf	67	THR
34	Lf	95	LYS
35	Lg	3	GLN
35	Lg	73	HIS
36	Lh	32	ARG
36	Lh	42	SER
36	Lh	45	SER
36	Lh	66	LYS
36	Lh	74	LYS
36	Lh	97	LYS
36	Lh	107	GLN
36	Lh	112	ARG
37	Li	29	ARG
37	Li	64	SER

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Mol	Chain	Res	Type
37	Li	66	ASP
37	Li	79	THR
37	Li	97	MET
38	Lj	6	SER
38	Lj	36	LYS
38	Lj	52	LYS
38	Lj	55	ARG
39	Lk	27	LYS
39	Lk	29	LYS
41	Lm	127	VAL
42	Ln	24	SER
43	Lo	27	LYS
43	Lo	78	ARG
43	Lo	96	ASP
44	Lp	28	LYS
44	Lp	59	SER
44	Lp	75	SER
45	Lr	37	SER
45	Lr	84	LYS
45	Lr	122	LYS
46	Ls	14	PHE
46	Ls	55	MET
46	Ls	88	PHE
46	Ls	92	LYS
46	Ls	177	MET
47	Lt	35	LEU
47	Lt	116	MET
47	Lt	126	SER
47	Lt	147	HIS
50	SA	10	MET
50	SA	12	GLU
50	SA	36	GLN
50	SA	43	SER
50	SA	75	SER
50	SA	117	ARG
50	SA	138	SER
50	SA	141	ASN
50	SA	169	HIS
50	SA	191	ARG
50	SA	198	MET
51	SB	27	LYS
51	SB	29	ASP

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Mol	Chain	Res	Type
51	SB	43	ASN
51	SB	62	LEU
51	SB	77	ASP
51	SB	108	ASP
51	SB	146	ARG
51	SB	182	LYS
51	SB	199	LYS
51	SB	222	LYS
51	SB	230	GLU
52	SD	18	LYS
52	SD	34	TYR
52	SD	40	ARG
52	SD	56	GLN
52	SD	64	ARG
52	SD	76	ARG
52	SD	149	SER
52	SD	162	ASP
52	SD	167	TYR
52	SD	168	VAL
52	SD	197	LYS
52	SD	201	LYS
52	SD	215	ASP
52	SD	225	GLU
53	SE	62	LYS
53	SE	88	ASP
53	SE	105	THR
53	SE	230	LYS
54	SF	18	LYS
54	SF	22	LYS
54	SF	37	ASP
54	SF	75	SER
54	SF	78	MET
54	SF	103	LEU
54	SF	125	SER
54	SF	127	ARG
54	SF	164	ARG
54	SF	185	SER
54	SF	198	ARG
54	SF	204	ARG
55	SH	14	GLU
55	SH	15	LYS
55	SH	29	GLU

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Mol	Chain	Res	Type
55	SH	33	ASN
55	SH	35	ASP
55	SH	50	GLU
55	SH	57	ARG
55	SH	78	ARG
55	SH	98	ARG
55	SH	149	ASP
56	SI	5	ARG
56	SI	45	THR
56	SI	49	ARG
56	SI	100	CYS
56	SI	153	LYS
56	SI	159	SER
56	SI	160	SER
56	SI	163	GLU
56	SI	179	PRO
57	SK	2	LEU
57	SK	3	MET
57	SK	6	LYS
57	SK	17	LYS
57	SK	21	MET
57	SK	29	MET
57	SK	53	LYS
57	SK	59	LYS
57	SK	85	LEU
57	SK	88	GLU
58	SL	19	ASN
58	SL	45	LYS
58	SL	49	GLU
58	SL	69	ARG
59	SP	17	TYR
59	SP	30	TYR
59	SP	37	TYR
59	SP	51	ARG
59	SP	61	ARG
59	SP	62	LYS
59	SP	70	MET
59	SP	72	LYS
59	SP	97	TYR
59	SP	116	LEU
59	SP	127	LYS
59	SP	130	ARG

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Mol	Chain	Res	Type
59	SP	136	THR
60	SQ	25	CYS
60	SQ	29	ASN
60	SQ	34	VAL
60	SQ	45	ARG
60	SQ	60	LYS
60	SQ	69	ARG
60	SQ	89	SER
60	SQ	110	ASP
60	SQ	127	CYS
61	SR	23	ARG
61	SR	67	ARG
61	SR	72	LYS
61	SR	79	GLU
61	SR	83	ASN
61	SR	116	ASN
61	SR	127	ASN
61	SR	130	THR
62	SS	8	LYS
62	SS	10	GLN
62	SS	14	ARG
62	SS	16	LEU
62	SS	62	ASP
62	SS	65	GLU
62	SS	83	PHE
62	SS	91	LYS
62	SS	104	ASP
62	SS	109	GLU
62	SS	144	ARG
63	ST	24	LYS
63	ST	33	TRP
63	ST	74	SER
63	ST	112	MET
63	ST	117	GLN
63	ST	128	GLN
63	ST	131	LEU
63	ST	132	ASP
63	ST	133	ARG
64	SU	17	ILE
64	SU	21	ARG
64	SU	25	THR
64	SU	34	LYS

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Mol	Chain	Res	Type
64	SU	59	LYS
64	SU	78	ASP
64	SU	86	LYS
64	SU	96	GLU
64	SU	97	ILE
64	SU	98	VAL
64	SU	99	LYS
65	SV	66	ASP
66	SX	60	LYS
66	SX	61	GLN
66	SX	70	VAL
66	SX	72	VAL
66	SX	95	GLU
66	SX	105	PHE
66	SX	123	VAL
66	SX	129	SER
67	Sa	2	THR
67	Sa	25	ASN
68	Sc	14	VAL
68	Sc	16	LYS
68	Sc	28	THR
68	Sc	51	ARG
68	Sc	60	GLU
69	Sd	6	LEU
69	Sd	7	TYR
69	Sd	13	LYS
69	Sd	19	ARG
70	Sg	14	HIS
70	Sg	30	MET
70	Sg	46	THR
70	Sg	60	ARG
70	Sg	70	VAL
70	Sg	86	THR
70	Sg	113	PHE
70	Sg	119	GLN
70	Sg	131	LEU
70	Sg	135	LEU
70	Sg	140	TYR
70	Sg	153	CYS
70	Sg	156	PHE
70	Sg	160	SER
70	Sg	177	TRP

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Mol	Chain	Res	Type
70	Sg	179	LEU
70	Sg	197	THR
70	Sg	200	VAL
70	Sg	219	TRP
70	Sg	225	LYS
70	Sg	228	TYR
70	Sg	240	CYS
70	Sg	247	TRP
70	Sg	289	LEU
70	Sg	303	THR
71	SC	76	LYS
71	SC	108	LYS
71	SC	145	LYS
71	SC	194	ARG
71	SC	222	CYS
71	SC	236	PHE
71	SC	248	TYR
71	SC	249	SER
71	SC	263	LYS
72	SG	10	THR
72	SG	13	GLN
72	SG	79	LYS
72	SG	103	ASP
72	SG	115	LYS
72	SG	119	LYS
72	SG	120	ASP
72	SG	126	ASP
72	SG	163	ASN
72	SG	171	THR
72	SG	183	ARG
72	SG	223	LYS
72	SG	227	GLN
73	SJ	7	TRP
73	SJ	79	ARG
73	SJ	107	GLU
73	SJ	141	VAL
73	SJ	158	ASP
75	SN	19	ARG
75	SN	43	LYS
75	SN	78	LYS
75	SN	107	LYS
75	SN	140	LYS

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Mol	Chain	Res	Type
75	SN	150	VAL
76	SO	80	ASP
76	SO	103	ASN
76	SO	117	ARG
76	SO	143	LYS
76	SO	149	ARG
76	SO	151	LEU
77	SW	25	VAL
77	SW	43	LYS
77	SW	54	ASP
78	SY	8	ARG
78	SY	14	THR
78	SY	23	MET
78	SY	24	VAL
78	SY	68	LYS
78	SY	69	THR
78	SY	81	TYR
78	SY	99	LYS
79	SZ	45	ASN
79	SZ	47	LEU
79	SZ	55	TYR
79	SZ	66	LYS
79	SZ	89	GLN
79	SZ	96	LEU
79	SZ	104	ARG
80	Sb	13	GLU
80	Sb	16	LYS
80	Sb	33	MET
80	Sb	34	ASP
80	Sb	56	CYS
81	Se	23	GLU
81	Se	24	LYS
81	Se	36	MET
81	Se	40	ARG
82	Sf	89	LYS
82	Sf	95	ARG
82	Sf	104	LYS
82	Sf	109	ASP
82	Sf	111	ASN
82	Sf	118	ARG
82	Sf	125	GLU
82	Sf	132	MET

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Mol	Chain	Res	Type
82	Sf	144	CYS
82	Sf	146	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
62	SS	101	ASN
64	SU	18	HIS
69	Sd	3	HIS
69	Sd	10	HIS
70	Sg	119	GLN
72	SG	227	GLN
73	SJ	113	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	L5	3704/5070 (73%)	777 (20%)	18 (0%)
2	L7	119/121 (98%)	9 (7%)	0
3	L8	155/157 (98%)	23 (14%)	0
49	S2	1717/1869 (91%)	374 (21%)	9 (0%)
All	All	5695/7217 (78%)	1183 (20%)	27 (0%)

All (1183) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	L5	15	A
1	L5	30	C
1	L5	39	A
1	L5	42	A
1	L5	48	G
1	L5	56	A
1	L5	59	A
1	L5	64	A
1	L5	65	A
1	L5	69	A
1	L5	73	A
1	L5	91	G
1	L5	98	A
1	L5	104	G

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Mol	Chain	Res	Type
1	L5	108	A
1	L5	109	G
1	L5	110	C
1	L5	112	C
1	L5	119	G
1	L5	120	A
1	L5	132	G
1	L5	133	C
1	L5	134	G
1	L5	135	G
1	L5	136	C
1	L5	137	G
1	L5	152	U
1	L5	159	C
1	L5	165	A
1	L5	169	G
1	L5	171	U
1	L5	172	C
1	L5	180	C
1	L5	181	C
1	L5	182	G
1	L5	183	C
1	L5	184	U
1	L5	185	C
1	L5	186	G
1	L5	187	U
1	L5	188	G
1	L5	189	G
1	L5	200	U
1	L5	209	U
1	L5	210	C
1	L5	216	C
1	L5	217	C
1	L5	218	A
1	L5	219	G
1	L5	220	C
1	L5	233	U
1	L5	250	C
1	L5	264	C
1	L5	266	C
1	L5	267	G
1	L5	269	G

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Mol	Chain	Res	Type
1	L5	276	C
1	L5	280	G
1	L5	297	U
1	L5	306	A
1	L5	315	G
1	L5	316	U
1	L5	340	C
1	L5	373	G
1	L5	387	G
1	L5	407	A
1	L5	409	G
1	L5	410	A
1	L5	412	G
1	L5	413	G
1	L5	431	G
1	L5	432	U
1	L5	449	C
1	L5	450	G
1	L5	452	A
1	L5	453	G
1	L5	454	U
1	L5	465	G
1	L5	467	U
1	L5	484	U
1	L5	485	C
1	L5	486	C
1	L5	489	C
1	L5	493	G
1	L5	494	U
1	L5	495	C
1	L5	497	G
1	L5	498	C
1	L5	500	G
1	L5	502	C
1	L5	503	C
1	L5	504	G
1	L5	505	G
1	L5	509	A
1	L5	510	U
1	L5	512	U
1	L5	513	U
1	L5	514	U

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Mol	Chain	Res	Type
1	L5	515	C
1	L5	516	C
1	L5	518	G
1	L5	643	C
1	L5	646	G
1	L5	657	C
1	L5	659	G
1	L5	665	C
1	L5	666	G
1	L5	667	A
1	L5	668	C
1	L5	669	C
1	L5	673	C
1	L5	685	C
1	L5	686	A
1	L5	687	U
1	L5	696	C
1	L5	703	G
1	L5	704	C
1	L5	708	G
1	L5	731	G
1	L5	738	C
1	L5	739	G
1	L5	740	G
1	L5	742	G
1	L5	746	A
1	L5	747	A
1	L5	753	C
1	L5	758	G
1	L5	759	G
1	L5	904	C
1	L5	906	C
1	L5	907	C
1	L5	913	U
1	L5	914	U
1	L5	915	A
1	L5	917	A
1	L5	918	G
1	L5	923	C
1	L5	924	C
1	L5	926	G
1	L5	931	C

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Mol	Chain	Res	Type
1	L5	932	A
1	L5	933	G
1	L5	935	A
1	L5	937	U
1	L5	941	C
1	L5	943	A
1	L5	945	U
1	L5	959	G
1	L5	960	A
1	L5	961	G
1	L5	962	C
1	L5	965	G
1	L5	966	A
1	L5	967	C
1	L5	969	C
1	L5	970	G
1	L5	972	C
1	L5	977	C
1	L5	982	U
1	L5	984	C
1	L5	989	U
1	L5	990	C
1	L5	992	C
1	L5	993	G
1	L5	995	C
1	L5	1048	G
1	L5	1049	C
1	L5	1050	C
1	L5	1051	G
1	L5	1070	G
1	L5	1071	C
1	L5	1075	G
1	L5	1095	A
1	L5	1168	G
1	L5	1171	G
1	L5	1172	C
1	L5	1173	G
1	L5	1178	G
1	L5	1179	U
1	L5	1180	C
1	L5	1181	C
1	L5	1182	C

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Mol	Chain	Res	Type
1	L5	1183	C
1	L5	1193	C
1	L5	1202	C
1	L5	1203	G
1	L5	1204	C
1	L5	1211	G
1	L5	1214	C
1	L5	1215	C
1	L5	1216	C
1	L5	1217	G
1	L5	1222	A
1	L5	1235	G
1	L5	1241	C
1	L5	1246	G
1	L5	1253	G
1	L5	1254	A
1	L5	1257	A
1	L5	1258	G
1	L5	1266	G
1	L5	1267	C
1	L5	1272	C
1	L5	1273	G
1	L5	1274	A
1	L5	1275	G
1	L5	1280	C
1	L5	1284	G
1	L5	1285	U
1	L5	1287	G
1	L5	1294	A
1	L5	1295	C
1	L5	1301	C
1	L5	1302	U
1	L5	1312	A
1	L5	1326	A
1	L5	1337	A
1	L5	1344	C
1	L5	1354	A
1	L5	1358	G
1	L5	1359	G
1	L5	1365	C
1	L5	1366	G
1	L5	1379	C

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Mol	Chain	Res	Type
1	L5	1387	A
1	L5	1394	G
1	L5	1397	A
1	L5	1404	G
1	L5	1405	C
1	L5	1407	C
1	L5	1409	C
1	L5	1410	U
1	L5	1411	C
1	L5	1414	C
1	L5	1415	G
1	L5	1417	C
1	L5	1420	A
1	L5	1425	G
1	L5	1435	G
1	L5	1438	U
1	L5	1444	G
1	L5	1447	C
1	L5	1448	G
1	L5	1457	G
1	L5	1465	G
1	L5	1482	G
1	L5	1483	C
1	L5	1493	G
1	L5	1494	U
1	L5	1497	A
1	L5	1498	G
1	L5	1502	G
1	L5	1517	G
1	L5	1525	A
1	L5	1534	A
1	L5	1547	A
1	L5	1562	G
1	L5	1564	A
1	L5	1566	C
1	L5	1578	U
1	L5	1591	U
1	L5	1596	U
1	L5	1624	G
1	L5	1625	G
1	L5	1631	A
1	L5	1633	G

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Mol	Chain	Res	Type
1	L5	1634	A
1	L5	1638	A
1	L5	1640	C
1	L5	1641	G
1	L5	1654	G
1	L5	1661	C
1	L5	1670	G
1	L5	1676	C
1	L5	1677	U
1	L5	1678	C
1	L5	1691	G
1	L5	1697	G
1	L5	1699	A
1	L5	1700	G
1	L5	1703	C
1	L5	1704	C
1	L5	1705	G
1	L5	1707	C
1	L5	1708	G
1	L5	1716	G
1	L5	1719	A
1	L5	1724	G
1	L5	1726	U
1	L5	1734	G
1	L5	1741	G
1	L5	1742	A
1	L5	1750	G
1	L5	1755	C
1	L5	1756	U
1	L5	1757	U
1	L5	1758	G
1	L5	1760	G
1	L5	1761	G
1	L5	1762	C
1	L5	1763	C
1	L5	1764	G
1	L5	1765	A
1	L5	1766	A
1	L5	1768	C
1	L5	1770	A
1	L5	1771	U
1	L5	1775	A

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Mol	Chain	Res	Type
1	L5	1781	U
1	L5	1785	C
1	L5	1787	A
1	L5	1804	A
1	L5	1810	G
1	L5	1815	G
1	L5	1820	C
1	L5	1821	G
1	L5	1822	U
1	L5	1834	U
1	L5	1836	G
1	L5	1837	A
1	L5	1842	G
1	L5	1843	A
1	L5	1855	G
1	L5	1869	G
1	L5	1892	A
1	L5	1897	A
1	L5	1918	U
1	L5	1919	G
1	L5	1920	C
1	L5	1921	C
1	L5	1922	G
1	L5	1925	G
1	L5	1931	C
1	L5	1932	A
1	L5	1936	C
1	L5	1940	G
1	L5	1948	G
1	L5	1949	U
1	L5	1951	G
1	L5	1959	U
1	L5	1960	A
1	L5	1961	G
1	L5	1962	A
1	L5	1972	G
1	L5	1974	U
1	L5	1975	G
1	L5	1978	C
1	L5	1980	U
1	L5	1983	A
1	L5	1984	A

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Mol	Chain	Res	Type
1	L5	1985	G
1	L5	1986	U
1	L5	1987	C
1	L5	1988	G
1	L5	1990	A
1	L5	1992	U
1	L5	1993	C
1	L5	1997	U
1	L5	1998	A
1	L5	2001	G
1	L5	2002	A
1	L5	2004	U
1	L5	2017	A
1	L5	2018	C
1	L5	2024	G
1	L5	2025	A
1	L5	2026	A
1	L5	2034	G
1	L5	2046	G
1	L5	2048	U
1	L5	2055	G
1	L5	2056	G
1	L5	2069	A
1	L5	2084	C
1	L5	2085	G
1	L5	2089	G
1	L5	2092	G
1	L5	2093	A
1	L5	2095	A
1	L5	2096	G
1	L5	2097	U
1	L5	2098	G
1	L5	2102	G
1	L5	2106	G
1	L5	2107	C
1	L5	2108	G
1	L5	2110	C
1	L5	2111	G
1	L5	2112	G
1	L5	2250	C
1	L5	2252	G
1	L5	2253	A

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Mol	Chain	Res	Type
1	L5	2256	C
1	L5	2261	G
1	L5	2289	C
1	L5	2300	A
1	L5	2301	G
1	L5	2313	A
1	L5	2316	G
1	L5	2333	G
1	L5	2348	G
1	L5	2351	C
1	L5	2360	A
1	L5	2395	A
1	L5	2396	A
1	L5	2397	G
1	L5	2412	A
1	L5	2417	A
1	L5	2421	G
1	L5	2425	U
1	L5	2441	C
1	L5	2450	G
1	L5	2453	A
1	L5	2464	C
1	L5	2465	C
1	L5	2474	G
1	L5	2475	G
1	L5	2478	C
1	L5	2479	G
1	L5	2483	G
1	L5	2484	A
1	L5	2485	U
1	L5	2487	G
1	L5	2488	C
1	L5	2489	C
1	L5	2490	U
1	L5	2491	C
1	L5	2495	U
1	L5	2503	G
1	L5	2504	C
1	L5	2505	C
1	L5	2506	G
1	L5	2513	A
1	L5	2519	U

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Mol	Chain	Res	Type
1	L5	2520	C
1	L5	2537	A
1	L5	2544	G
1	L5	2546	G
1	L5	2547	G
1	L5	2554	U
1	L5	2559	G
1	L5	2560	C
1	L5	2565	A
1	L5	2573	A
1	L5	2583	C
1	L5	2587	A
1	L5	2611	A
1	L5	2627	C
1	L5	2653	C
1	L5	2662	G
1	L5	2669	C
1	L5	2676	A
1	L5	2686	G
1	L5	2687	U
1	L5	2694	G
1	L5	2695	A
1	L5	2696	A
1	L5	2703	G
1	L5	2707	U
1	L5	2708	U
1	L5	2709	C
1	L5	2710	C
1	L5	2711	G
1	L5	2721	G
1	L5	2724	G
1	L5	2726	G
1	L5	2739	C
1	L5	2742	G
1	L5	2743	A
1	L5	2746	A
1	L5	2756	G
1	L5	2761	U
1	L5	2763	U
1	L5	2769	U
1	L5	2770	C
1	L5	2787	A

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Mol	Chain	Res	Type
1	L5	2788	U
1	L5	2790	U
1	L5	2794	C
1	L5	2814	C
1	L5	2815	A
1	L5	2826	U
1	L5	2827	G
1	L5	2838	G
1	L5	2855	G
1	L5	2877	G
1	L5	2892	C
1	L5	2894	A
1	L5	2900	U
1	L5	2902	G
1	L5	2903	G
1	L5	2904	U
1	L5	2905	C
1	L5	2906	G
1	L5	2908	U
1	L5	3585	G
1	L5	3587	C
1	L5	3588	C
1	L5	3590	G
1	L5	3591	C
1	L5	3594	C
1	L5	3595	U
1	L5	3596	A
1	L5	3597	G
1	L5	3604	A
1	L5	3606	U
1	L5	3615	G
1	L5	3618	C
1	L5	3626	G
1	L5	3635	A
1	L5	3644	U
1	L5	3646	A
1	L5	3648	A
1	L5	3662	A
1	L5	3673	C
1	L5	3674	G
1	L5	3713	U
1	L5	3727	A

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Mol	Chain	Res	Type
1	L5	3748	A
1	L5	3750	G
1	L5	3753	G
1	L5	3757	G
1	L5	3758	U
1	L5	3759	A
1	L5	3760	A
1	L5	3761	C
1	L5	3771	C
1	L5	3776	G
1	L5	3777	G
1	L5	3784	A
1	L5	3786	U
1	L5	3811	G
1	L5	3812	C
1	L5	3814	U
1	L5	3817	A
1	L5	3818	U
1	L5	3819	G
1	L5	3823	G
1	L5	3824	A
1	L5	3838	U
1	L5	3839	G
1	L5	3840	U
1	L5	3851	U
1	L5	3867	A
1	L5	3877	A
1	L5	3878	C
1	L5	3879	G
1	L5	3885	G
1	L5	3887	C
1	L5	3892	U
1	L5	3897	G
1	L5	3898	G
1	L5	3901	A
1	L5	3906	A
1	L5	3907	G
1	L5	3908	A
1	L5	3915	U
1	L5	3938	G
1	L5	3939	G
1	L5	3942	A

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Mol	Chain	Res	Type
1	L5	3943	A
1	L5	3949	A
1	L5	3950	U
1	L5	3955	G
1	L5	3956	G
1	L5	3957	U
1	L5	3958	G
1	L5	3959	U
1	L5	3960	A
1	L5	3961	G
1	L5	3962	A
1	L5	3963	A
1	L5	3964	U
1	L5	3965	A
1	L5	3966	A
1	L5	3967	G
1	L5	3969	G
1	L5	3970	G
1	L5	3971	G
1	L5	3973	G
1	L5	3974	G
1	L5	3975	C
1	L5	3977	C
1	L5	4034	G
1	L5	4036	G
1	L5	4038	C
1	L5	4039	G
1	L5	4041	C
1	L5	4042	G
1	L5	4043	G
1	L5	4045	G
1	L5	4046	A
1	L5	4048	A
1	L5	4049	U
1	L5	4051	C
1	L5	4052	C
1	L5	4053	A
1	L5	4054	C
1	L5	4064	C
1	L5	4065	G
1	L5	4076	G
1	L5	4084	G

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Mol	Chain	Res	Type
1	L5	4086	G
1	L5	4097	G
1	L5	4099	G
1	L5	4102	C
1	L5	4103	C
1	L5	4104	G
1	L5	4107	G
1	L5	4108	G
1	L5	4111	U
1	L5	4114	C
1	L5	4115	G
1	L5	4116	C
1	L5	4117	U
1	L5	4119	C
1	L5	4120	U
1	L5	4122	G
1	L5	4127	A
1	L5	4140	C
1	L5	4141	G
1	L5	4142	C
1	L5	4143	G
1	L5	4144	C
1	L5	4146	G
1	L5	4149	C
1	L5	4150	G
1	L5	4162	C
1	L5	4163	U
1	L5	4170	A
1	L5	4183	G
1	L5	4184	G
1	L5	4191	G
1	L5	4196	G
1	L5	4203	A
1	L5	4222	G
1	L5	4229	U
1	L5	4233	A
1	L5	4251	A
1	L5	4254	G
1	L5	4257	A
1	L5	4265	U
1	L5	4268	A
1	L5	4273	A

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Mol	Chain	Res	Type
1	L5	4291	G
1	L5	4295	U
1	L5	4304	A
1	L5	4305	G
1	L5	4306	U
1	L5	4314	C
1	L5	4319	C
1	L5	4329	G
1	L5	4330	G
1	L5	4332	C
1	L5	4349	C
1	L5	4373	G
1	L5	4376	A
1	L5	4377	G
1	L5	4378	A
1	L5	4380	A
1	L5	4387	C
1	L5	4391	G
1	L5	4394	A
1	L5	4422	A
1	L5	4426	C
1	L5	4448	G
1	L5	4449	A
1	L5	4453	C
1	L5	4464	A
1	L5	4475	G
1	L5	4488	A
1	L5	4500	U
1	L5	4512	U
1	L5	4513	A
1	L5	4515	G
1	L5	4519	C
1	L5	4524	G
1	L5	4545	G
1	L5	4548	A
1	L5	4549	G
1	L5	4560	C
1	L5	4567	G
1	L5	4573	G
1	L5	4575	G
1	L5	4590	A
1	L5	4600	G

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Mol	Chain	Res	Type
1	L5	4617	G
1	L5	4636	U
1	L5	4637	G
1	L5	4656	A
1	L5	4657	U
1	L5	4670	C
1	L5	4672	A
1	L5	4679	G
1	L5	4687	A
1	L5	4694	G
1	L5	4695	C
1	L5	4700	A
1	L5	4708	A
1	L5	4709	U
1	L5	4719	G
1	L5	4720	C
1	L5	4734	A
1	L5	4741	C
1	L5	4742	G
1	L5	4745	G
1	L5	4750	G
1	L5	4754	G
1	L5	4757	C
1	L5	4759	C
1	L5	4761	G
1	L5	4764	A
1	L5	4765	G
1	L5	4771	C
1	L5	4772	C
1	L5	4773	C
1	L5	4775	C
1	L5	4776	G
1	L5	4859	C
1	L5	4870	G
1	L5	4871	C
1	L5	4875	G
1	L5	4876	U
1	L5	4882	U
1	L5	4883	C
1	L5	4888	U
1	L5	4889	G
1	L5	4895	C

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Mol	Chain	Res	Type
1	L5	4896	G
1	L5	4900	C
1	L5	4901	G
1	L5	4902	C
1	L5	4910	G
1	L5	4911	A
1	L5	4912	G
1	L5	4914	C
1	L5	4922	C
1	L5	4923	C
1	L5	4925	U
1	L5	4926	C
1	L5	4934	A
1	L5	4940	C
1	L5	4941	G
1	L5	4943	A
1	L5	4951	G
1	L5	4955	A
1	L5	4960	G
1	L5	4961	G
1	L5	4963	G
1	L5	4966	A
1	L5	4967	A
1	L5	4973	U
1	L5	4976	U
1	L5	4979	A
1	L5	4985	U
1	L5	4988	U
1	L5	4989	U
1	L5	4991	U
1	L5	5009	G
1	L5	5014	A
1	L5	5017	G
1	L5	5022	U
1	L5	5023	C
1	L5	5025	C
1	L5	5026	U
1	L5	5027	C
1	L5	5028	G
1	L5	5029	C
1	L5	5030	U
1	L5	5034	A

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Mol	Chain	Res	Type
1	L5	5041	G
1	L5	5050	C
1	L5	5054	C
1	L5	5055	G
1	L5	5058	A
1	L5	5062	G
1	L5	5069	U
2	L7	33	U
2	L7	38	U
2	L7	53	U
2	L7	54	A
2	L7	64	G
2	L7	100	A
2	L7	106	G
2	L7	110	G
2	L7	111	C
3	L8	34	U
3	L8	35	C
3	L8	48	A
3	L8	59	A
3	L8	62	A
3	L8	63	U
3	L8	82	A
3	L8	83	C
3	L8	84	A
3	L8	85	U
3	L8	86	U
3	L8	87	G
3	L8	94	G
3	L8	103	A
3	L8	105	C
3	L8	110	U
3	L8	114	G
3	L8	123	U
3	L8	124	U
3	L8	125	C
3	L8	126	C
3	L8	127	U
3	L8	147	G
49	S2	2	A
49	S2	23	G
49	S2	33	G

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Mol	Chain	Res	Type
49	S2	41	G
49	S2	44	U
49	S2	45	A
49	S2	46	A
49	S2	56	G
49	S2	58	C
49	S2	59	U
49	S2	62	G
49	S2	64	A
49	S2	65	C
49	S2	67	C
49	S2	68	A
49	S2	72	C
49	S2	73	C
49	S2	74	G
49	S2	76	U
49	S2	99	A
49	S2	103	A
49	S2	113	G
49	S2	115	U
49	S2	126	G
49	S2	129	C
49	S2	130	G
49	S2	139	C
49	S2	143	U
49	S2	149	A
49	S2	155	G
49	S2	162	C
49	S2	163	U
49	S2	168	C
49	S2	190	G
49	S2	198	U
49	S2	200	G
49	S2	203	G
49	S2	204	G
49	S2	207	G
49	S2	211	G
49	S2	214	U
49	S2	291	G
49	S2	292	A
49	S2	293	C
49	S2	294	U

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Mol	Chain	Res	Type
49	S2	295	C
49	S2	306	C
49	S2	307	G
49	S2	308	G
49	S2	309	G
49	S2	318	A
49	S2	319	C
49	S2	323	C
49	S2	324	C
49	S2	325	C
49	S2	326	C
49	S2	328	U
49	S2	329	G
49	S2	332	G
49	S2	339	A
49	S2	347	G
49	S2	351	G
49	S2	360	A
49	S2	362	C
49	S2	364	A
49	S2	368	U
49	S2	369	C
49	S2	370	G
49	S2	385	G
49	S2	386	C
49	S2	407	G
49	S2	408	A
49	S2	409	C
49	S2	417	C
49	S2	418	A
49	S2	438	G
49	S2	448	A
49	S2	449	A
49	S2	450	C
49	S2	452	G
49	S2	464	A
49	S2	471	G
49	S2	472	C
49	S2	473	A
49	S2	474	G
49	S2	482	G
49	S2	487	U

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Mol	Chain	Res	Type
49	S2	488	U
49	S2	492	C
49	S2	493	A
49	S2	496	C
49	S2	516	A
49	S2	517	C
49	S2	523	A
49	S2	525	A
49	S2	530	U
49	S2	540	U
49	S2	541	U
49	S2	542	U
49	S2	545	A
49	S2	547	G
49	S2	548	C
49	S2	554	A
49	S2	559	G
49	S2	563	G
49	S2	564	A
49	S2	576	A
49	S2	583	C
49	S2	587	A
49	S2	589	G
49	S2	591	U
49	S2	592	C
49	S2	597	G
49	S2	604	A
49	S2	608	C
49	S2	614	C
49	S2	617	G
49	S2	623	G
49	S2	627	U
49	S2	628	A
49	S2	629	A
49	S2	631	U
49	S2	632	C
49	S2	643	A
49	S2	644	G
49	S2	655	A
49	S2	660	C
49	S2	668	A
49	S2	669	A

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Mol	Chain	Res	Type
49	S2	671	A
49	S2	672	A
49	S2	673	G
49	S2	688	U
49	S2	689	U
49	S2	690	G
49	S2	692	G
49	S2	693	A
49	S2	695	C
49	S2	696	G
49	S2	697	G
49	S2	698	G
49	S2	732	U
49	S2	736	C
49	S2	738	C
49	S2	749	U
49	S2	751	G
49	S2	752	G
49	S2	753	C
49	S2	788	G
49	S2	791	C
49	S2	792	C
49	S2	794	A
49	S2	798	A
49	S2	799	U
49	S2	810	A
49	S2	821	G
49	S2	822	U
49	S2	827	A
49	S2	830	A
49	S2	834	C
49	S2	835	C
49	S2	836	G
49	S2	837	A
49	S2	838	G
49	S2	839	C
49	S2	840	C
49	S2	841	G
49	S2	842	C
49	S2	847	A
49	S2	869	A
49	S2	870	A

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Mol	Chain	Res	Type
49	S2	873	G
49	S2	877	C
49	S2	880	G
49	S2	883	U
49	S2	887	U
49	S2	888	U
49	S2	889	U
49	S2	891	G
49	S2	893	U
49	S2	894	G
49	S2	896	U
49	S2	897	U
49	S2	898	U
49	S2	899	U
49	S2	900	C
49	S2	901	G
49	S2	903	A
49	S2	904	A
49	S2	913	A
49	S2	920	A
49	S2	922	A
49	S2	930	C
49	S2	933	G
49	S2	934	G
49	S2	943	U
49	S2	963	A
49	S2	990	A
49	S2	992	A
49	S2	997	A
49	S2	999	G
49	S2	1001	A
49	S2	1016	U
49	S2	1017	U
49	S2	1023	A
49	S2	1027	A
49	S2	1061	U
49	S2	1062	A
49	S2	1067	C
49	S2	1083	A
49	S2	1085	C
49	S2	1089	G
49	S2	1109	C

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Mol	Chain	Res	Type
49	S2	1114	U
49	S2	1115	U
49	S2	1116	C
49	S2	1118	C
49	S2	1121	G
49	S2	1131	G
49	S2	1133	A
49	S2	1138	C
49	S2	1153	C
49	S2	1154	U
49	S2	1195	A
49	S2	1207	G
49	S2	1208	A
49	S2	1212	G
49	S2	1215	C
49	S2	1216	C
49	S2	1217	A
49	S2	1224	G
49	S2	1227	G
49	S2	1242	U
49	S2	1243	U
49	S2	1251	A
49	S2	1253	A
49	S2	1256	G
49	S2	1257	G
49	S2	1259	A
49	S2	1264	C
49	S2	1274	G
49	S2	1275	G
49	S2	1277	C
49	S2	1283	C
49	S2	1284	A
49	S2	1286	G
49	S2	1290	G
49	S2	1291	A
49	S2	1294	G
49	S2	1295	A
49	S2	1301	A
49	S2	1302	G
49	S2	1303	C
49	S2	1305	C
49	S2	1308	U

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Mol	Chain	Res	Type
49	S2	1312	G
49	S2	1313	A
49	S2	1333	U
49	S2	1342	U
49	S2	1343	U
49	S2	1348	G
49	S2	1363	C
49	S2	1371	U
49	S2	1372	U
49	S2	1373	C
49	S2	1378	A
49	S2	1396	A
49	S2	1397	U
49	S2	1402	A
49	S2	1404	U
49	S2	1416	C
49	S2	1421	A
49	S2	1423	C
49	S2	1431	G
49	S2	1433	C
49	S2	1434	C
49	S2	1435	C
49	S2	1436	C
49	S2	1438	A
49	S2	1449	G
49	S2	1452	A
49	S2	1454	A
49	S2	1462	U
49	S2	1463	U
49	S2	1480	A
49	S2	1487	A
49	S2	1489	A
49	S2	1490	G
49	S2	1497	G
49	S2	1498	A
49	S2	1505	U
49	S2	1507	G
49	S2	1520	G
49	S2	1521	C
49	S2	1523	C
49	S2	1533	A
49	S2	1535	U

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Mol	Chain	Res	Type
49	S2	1537	A
49	S2	1544	C
49	S2	1552	G
49	S2	1553	C
49	S2	1556	A
49	S2	1558	C
49	S2	1560	U
49	S2	1567	G
49	S2	1570	G
49	S2	1580	A
49	S2	1585	U
49	S2	1587	G
49	S2	1588	A
49	S2	1601	A
49	S2	1606	G
49	S2	1621	U
49	S2	1623	A
49	S2	1632	G
49	S2	1634	A
49	S2	1637	A
49	S2	1638	G
49	S2	1640	A
49	S2	1644	C
49	S2	1647	A
49	S2	1648	G
49	S2	1654	G
49	S2	1663	A
49	S2	1665	G
49	S2	1671	G
49	S2	1680	G
49	S2	1683	C
49	S2	1686	G
49	S2	1696	C
49	S2	1699	A
49	S2	1701	C
49	S2	1721	U
49	S2	1722	G
49	S2	1742	C
49	S2	1743	G
49	S2	1744	G
49	S2	1745	A
49	S2	1752	C

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Mol	Chain	Res	Type
49	S2	1753	C
49	S2	1754	G
49	S2	1757	G
49	S2	1758	G
49	S2	1759	G
49	S2	1760	G
49	S2	1761	U
49	S2	1771	G
49	S2	1772	C
49	S2	1773	C
49	S2	1774	C
49	S2	1775	U
49	S2	1776	G
49	S2	1777	G
49	S2	1781	A
49	S2	1783	C
49	S2	1784	G
49	S2	1787	G
49	S2	1798	C
49	S2	1822	A
49	S2	1824	A
49	S2	1825	A
49	S2	1826	G
49	S2	1829	G
49	S2	1831	A
49	S2	1835	A
49	S2	1838	U
49	S2	1849	G
49	S2	1851	A
49	S2	1852	C
49	S2	1861	G
49	S2	1862	G
49	S2	1863	A
49	S2	1864	U
49	S2	1865	C

All (27) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	L5	157	U
1	L5	218	A
1	L5	406	C

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Mol	Chain	Res	Type
1	L5	493	G
1	L5	914	U
1	L5	1633	G
1	L5	1977	C
1	L5	2033	A
1	L5	2416	G
1	L5	2675	G
1	L5	2760	G
1	L5	2786	C
1	L5	3614	G
1	L5	3673	C
1	L5	3876	A
1	L5	4378	A
1	L5	4699	U
1	L5	4913	G
49	S2	112	U
49	S2	291	G
49	S2	293	C
49	S2	417	C
49	S2	563	G
49	S2	628	A
49	S2	688	U
49	S2	1290	G
49	S2	1434	C

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 263 ligands modelled in this entry, 263 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

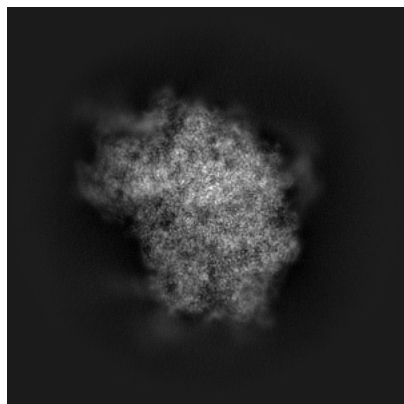
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-39456. These allow visual inspection of the internal detail of the map and identification of artifacts.

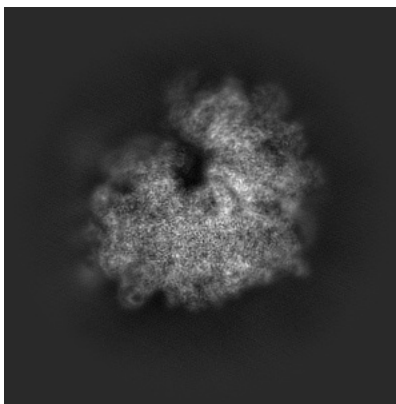
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

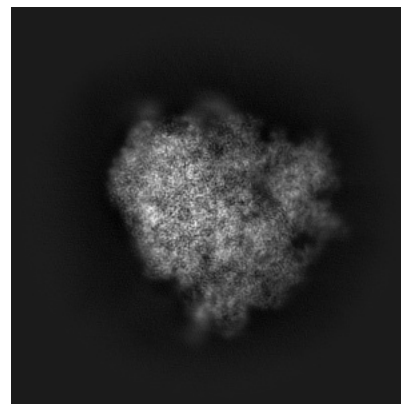
6.1.1 Primary map



X

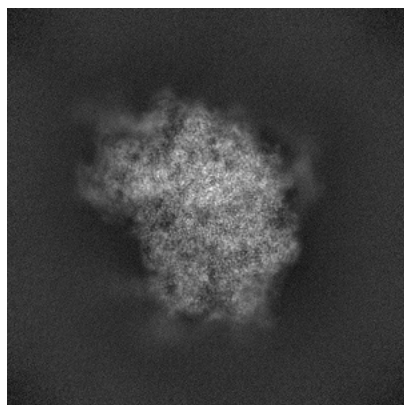


Y

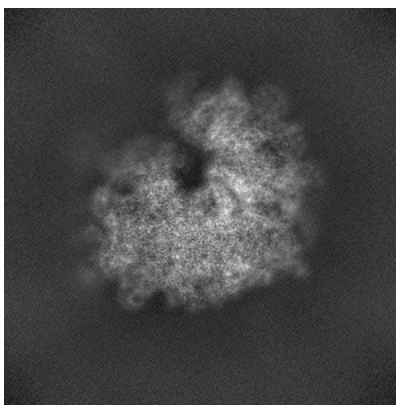


Z

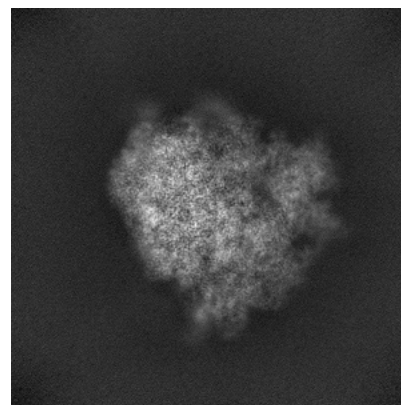
6.1.2 Raw map



X



Y

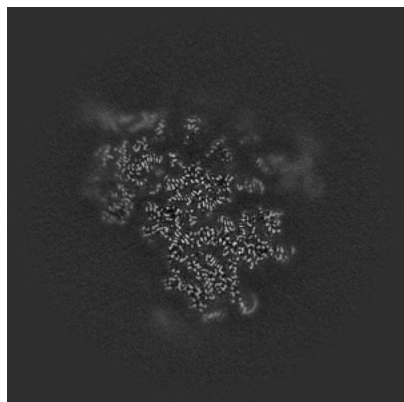


Z

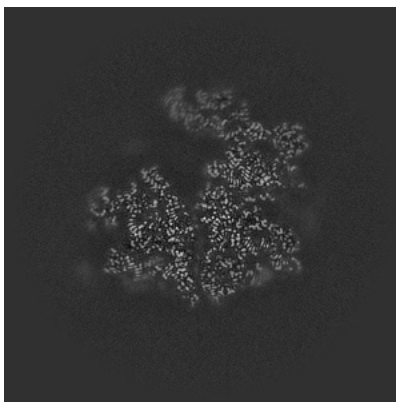
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

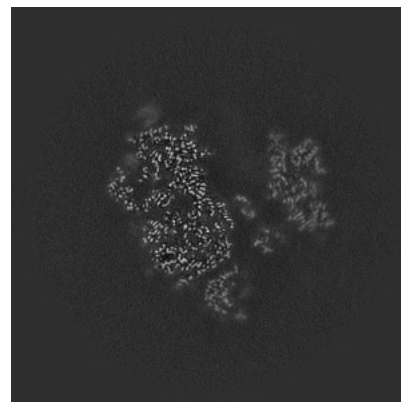
6.2.1 Primary map



X Index: 315

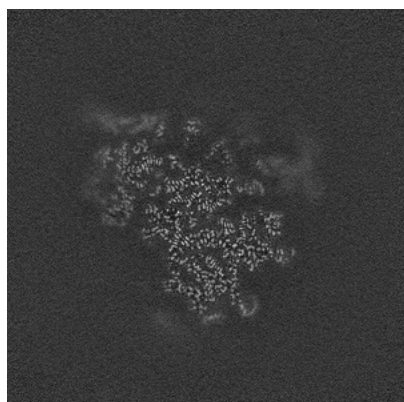


Y Index: 315

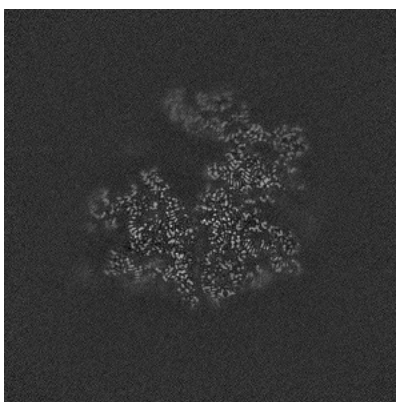


Z Index: 315

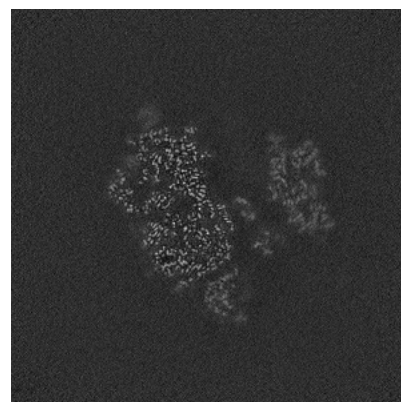
6.2.2 Raw map



X Index: 315



Y Index: 315

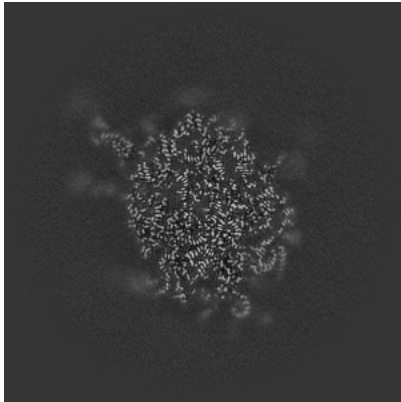


Z Index: 315

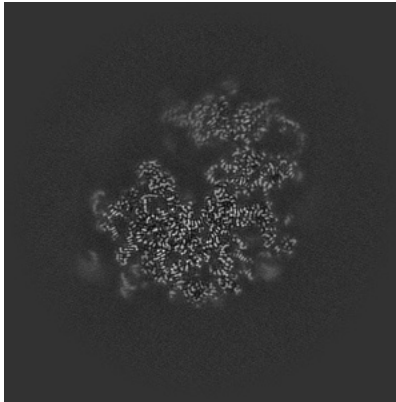
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

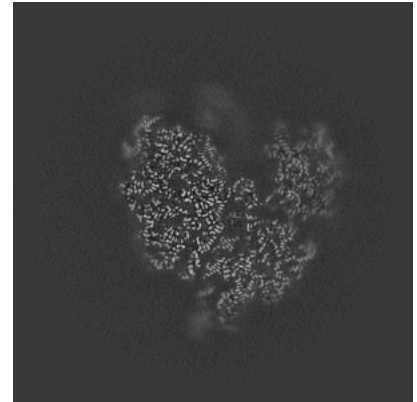
6.3.1 Primary map



X Index: 285

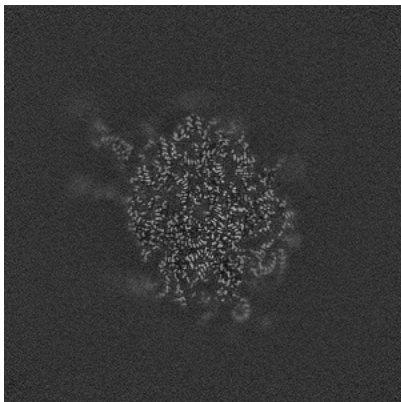


Y Index: 333

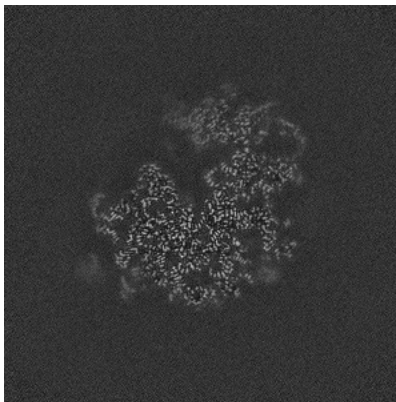


Z Index: 350

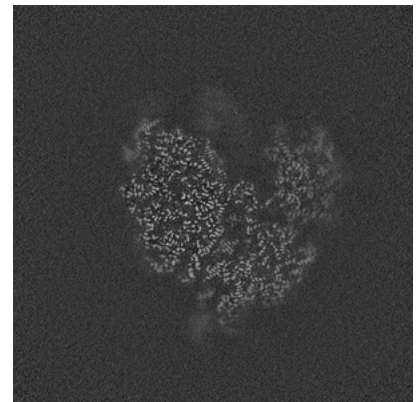
6.3.2 Raw map



X Index: 285



Y Index: 332

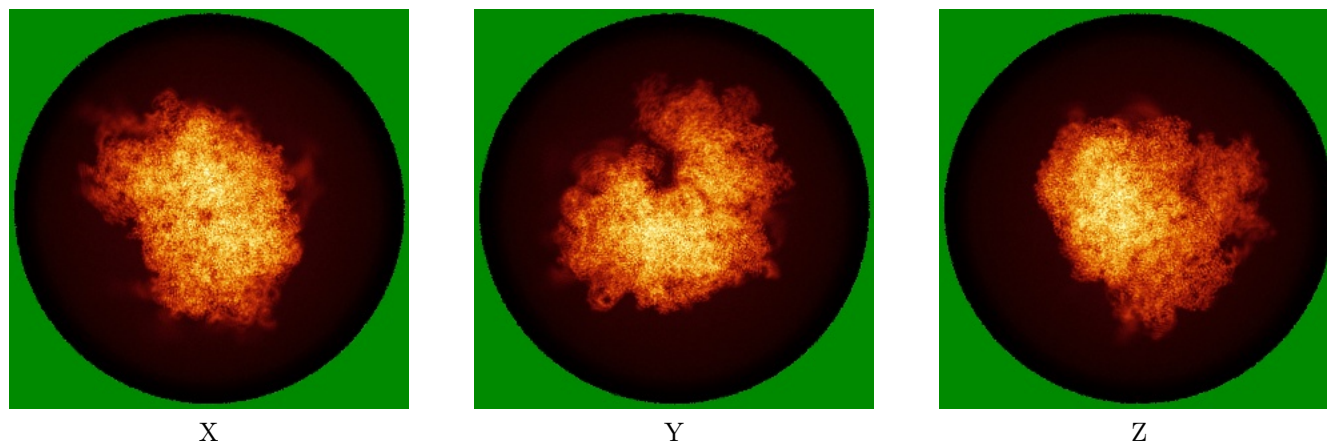


Z Index: 350

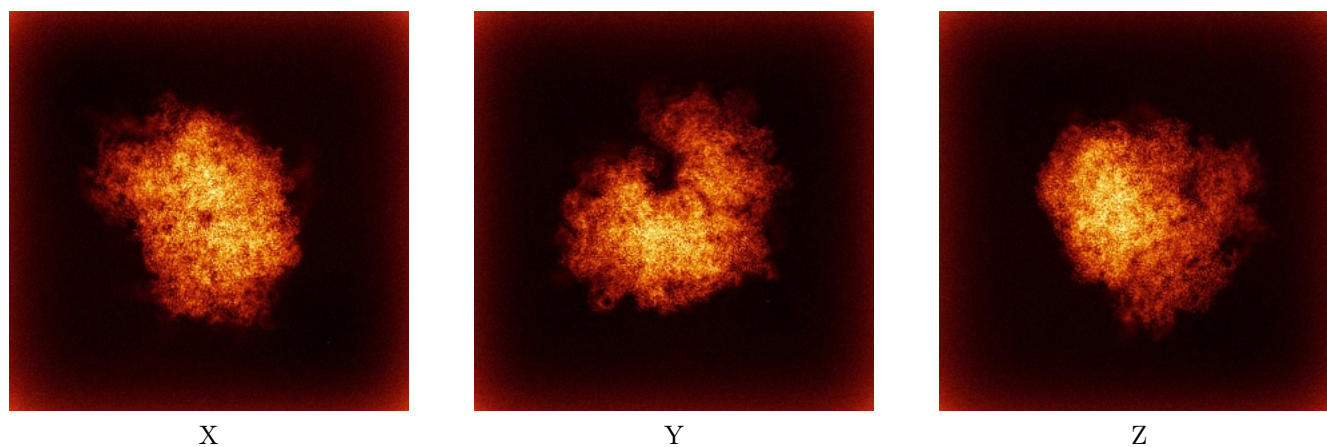
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

6.4.1 Primary map



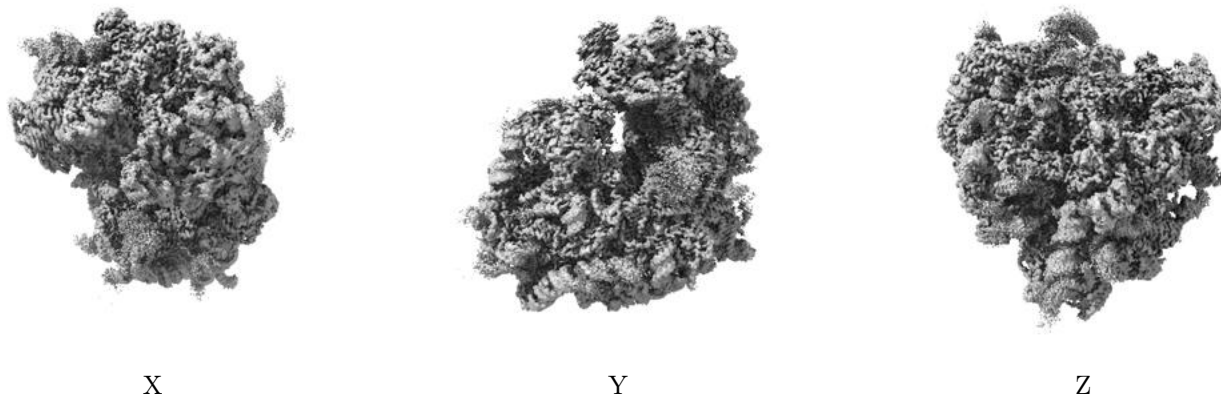
6.4.2 Raw map



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

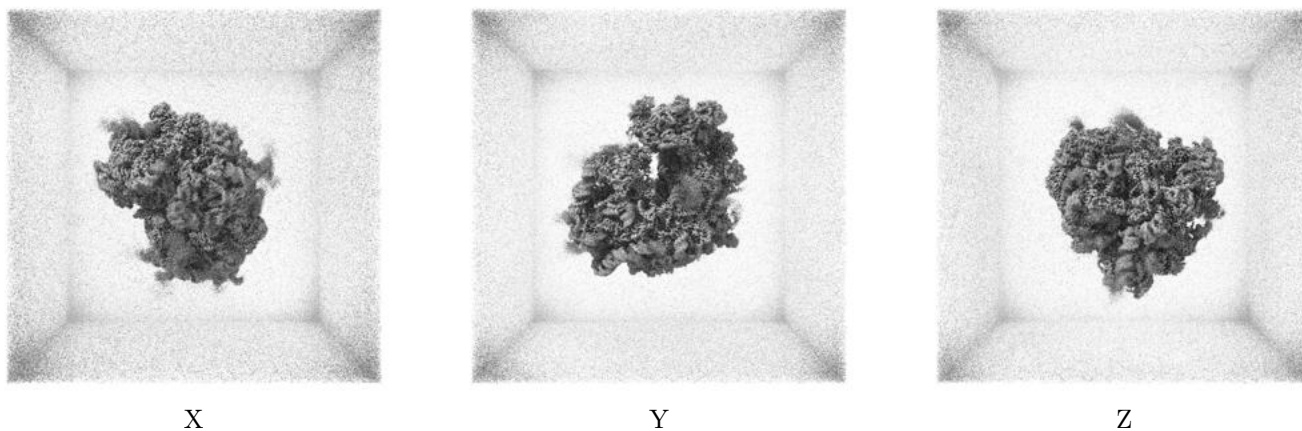
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.2. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

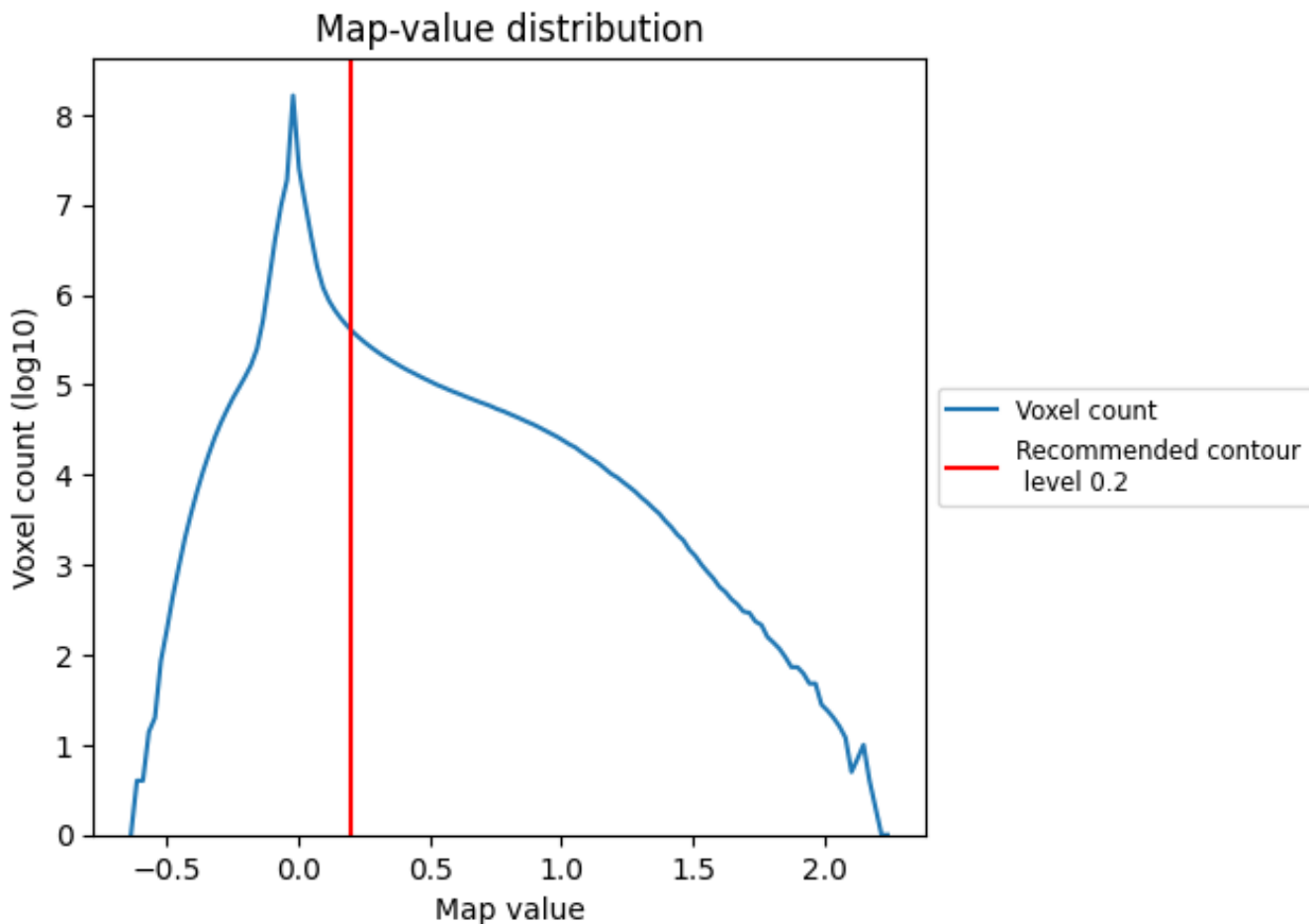
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

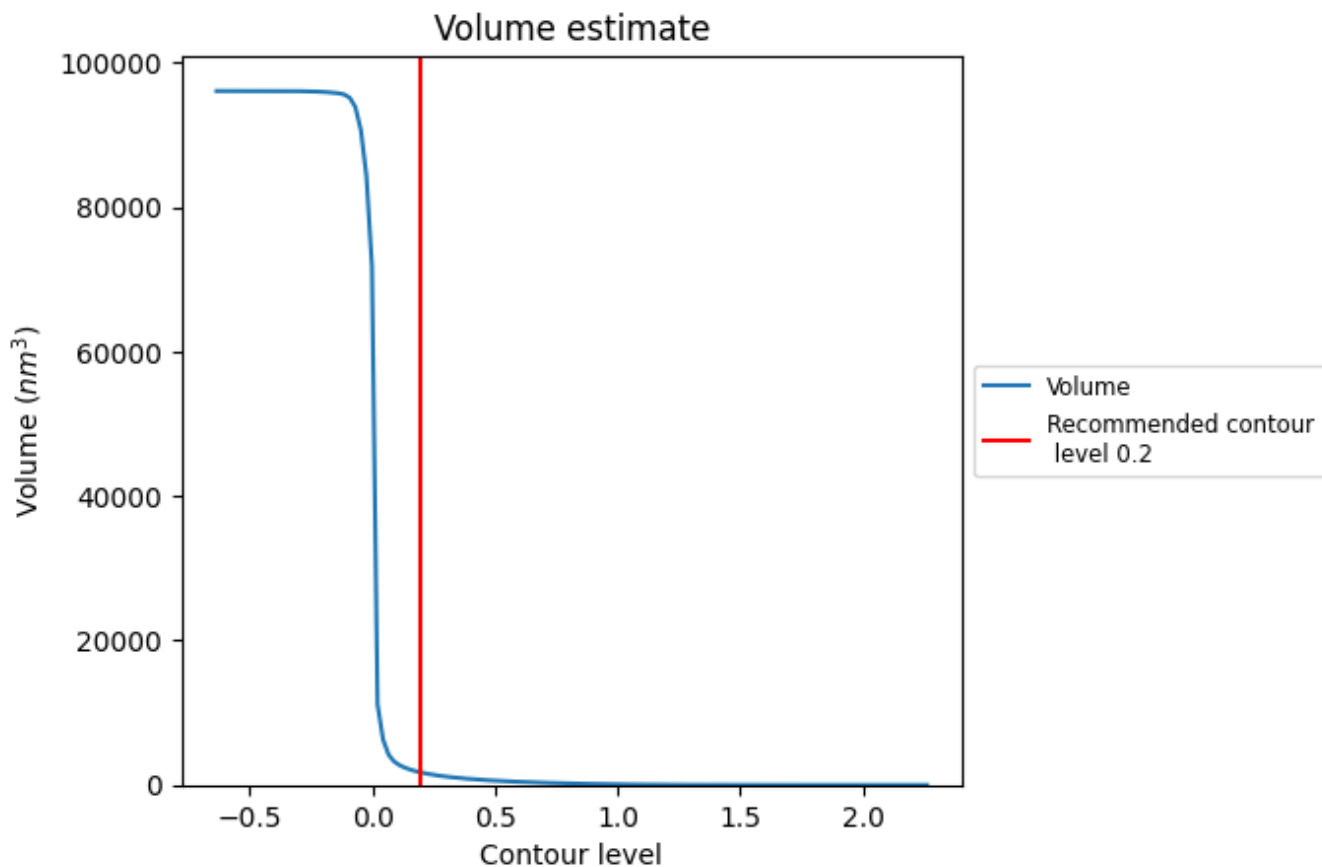
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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.

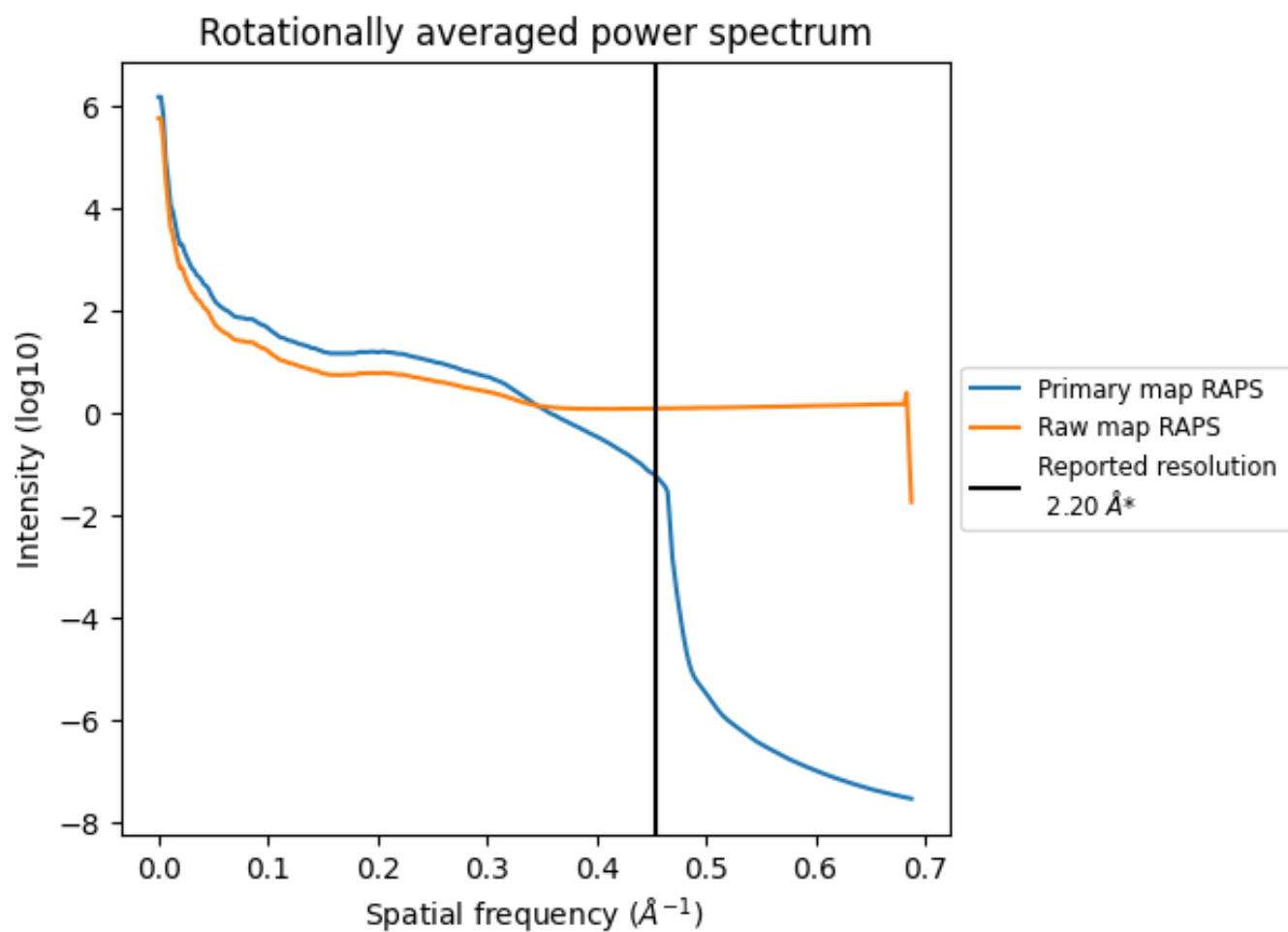
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 1722 nm^3 ; this corresponds to an approximate mass of 1555 kDa.

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

7.3 Rotationally averaged power spectrum [i](#)

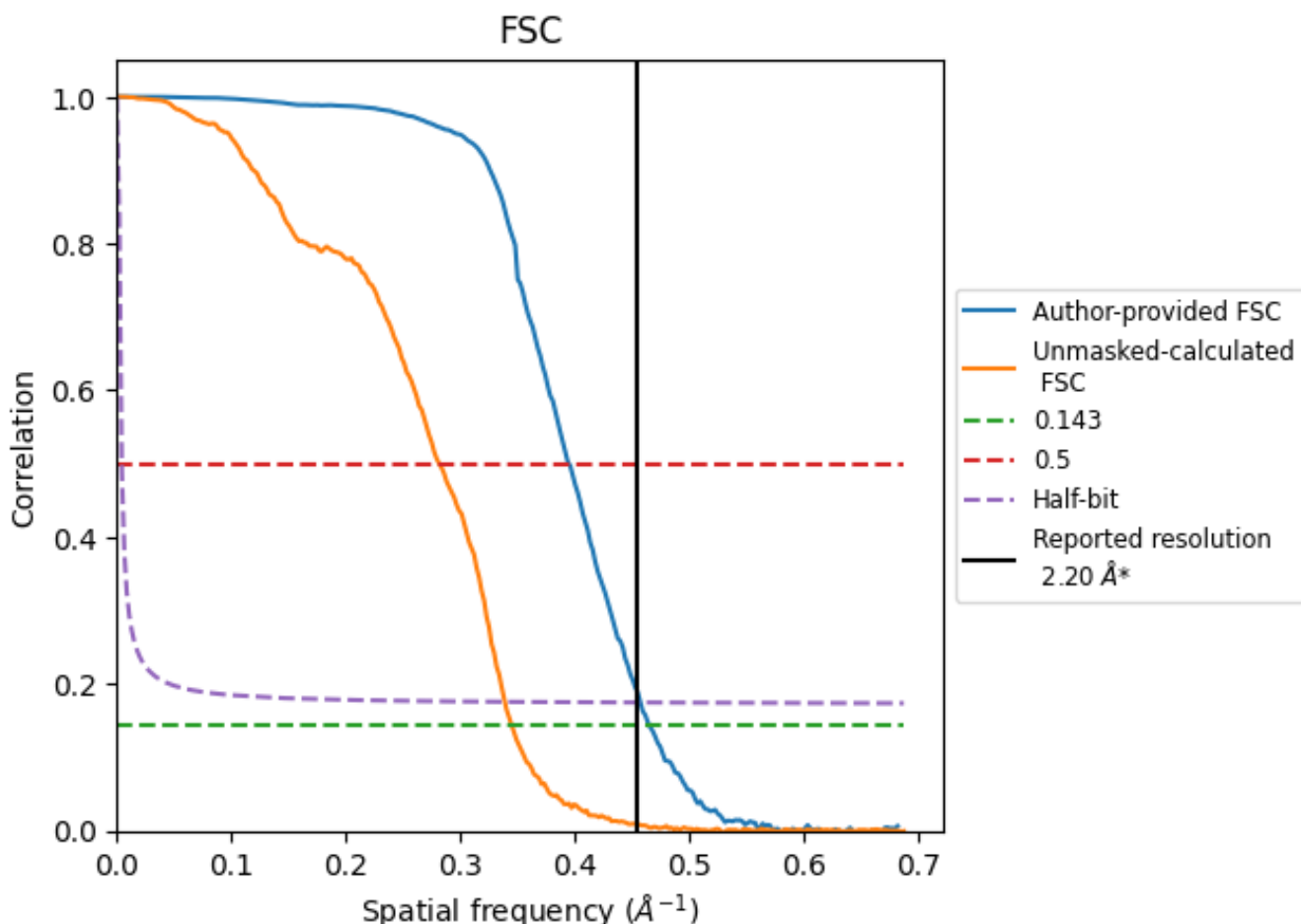


*Reported resolution corresponds to spatial frequency of 0.455 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.455 \AA^{-1}

8.2 Resolution estimates [i](#)

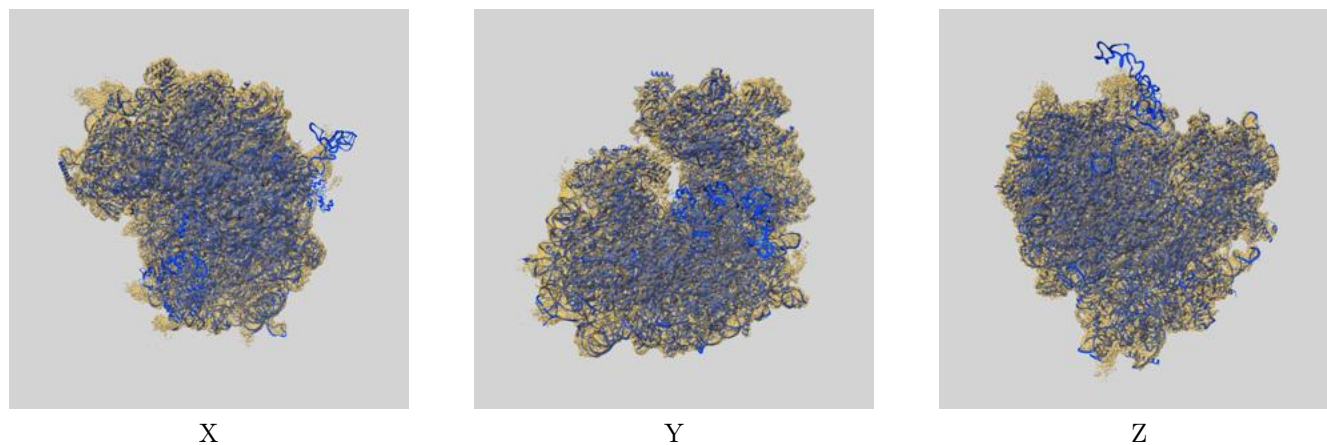
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.20	-	-
Author-provided FSC curve	2.15	2.53	2.19
Unmasked-calculated*	2.90	3.55	2.95

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 2.90 differs from the reported value 2.2 by more than 10 %

9 Map-model fit [i](#)

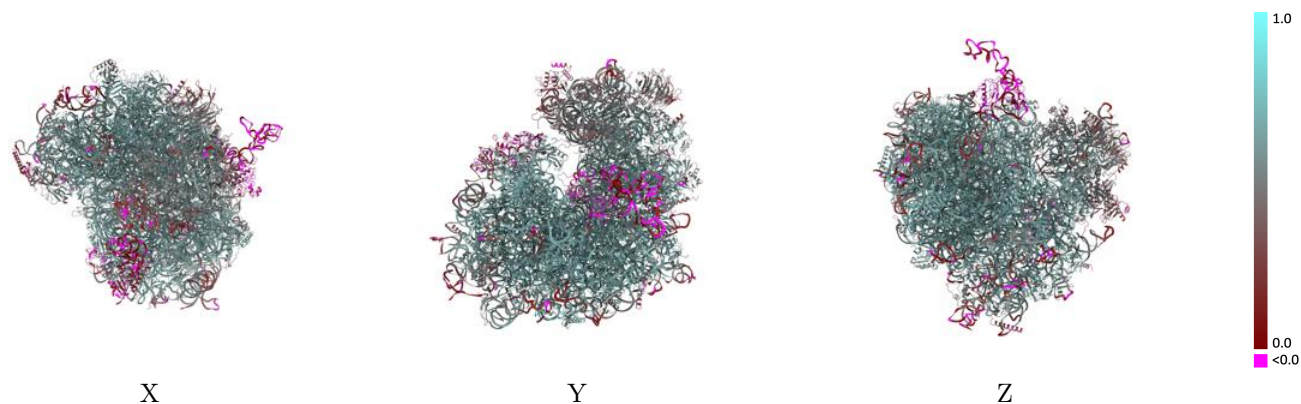
This section contains information regarding the fit between EMDB map EMD-39456 and PDB model 8YOP. Per-residue inclusion information can be found in section 3 on page 20.

9.1 Map-model overlay [i](#)



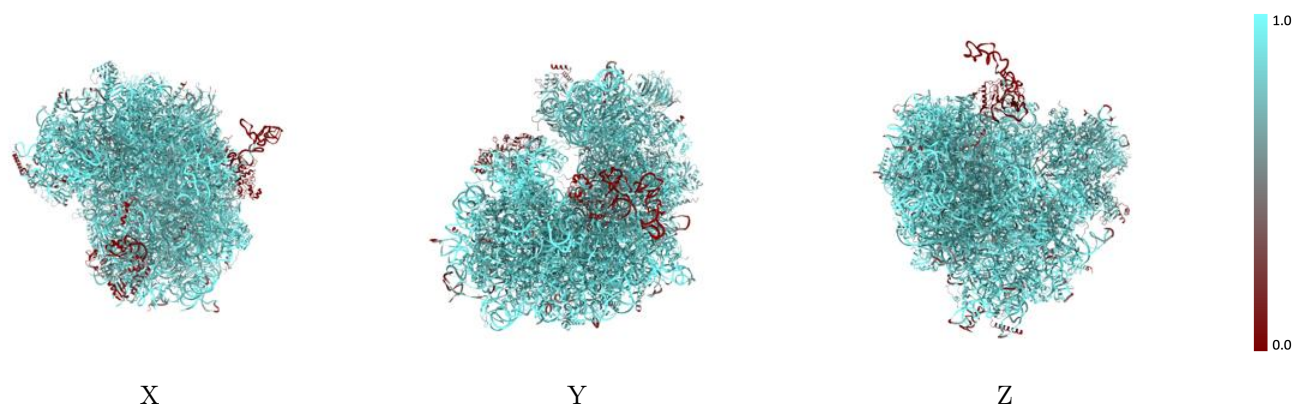
The images above show the 3D surface view of the map at the recommended contour level 0.2 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



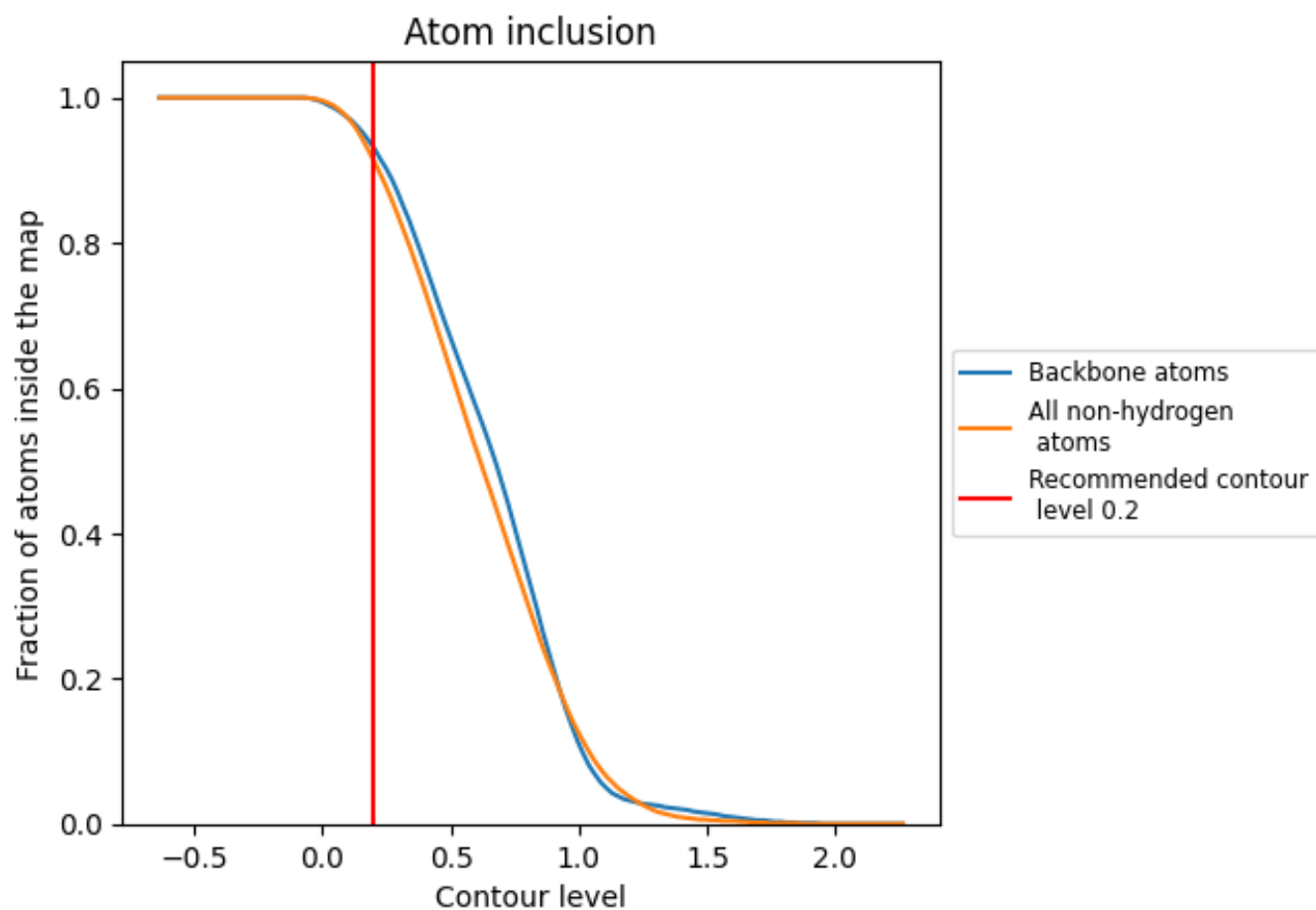
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 [i](#)



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 (0.2).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 93% of all backbone atoms, 91% 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 (0.2) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9140	 0.5660
L5	 0.9350	 0.5740
L7	 0.9960	 0.6360
L8	 0.9650	 0.6100
LA	 0.9780	 0.6690
LB	 0.9520	 0.6420
LC	 0.9480	 0.6320
LD	 0.9490	 0.6050
LE	 0.9340	 0.5950
LF	 0.9610	 0.6450
LG	 0.8880	 0.5720
LH	 0.9480	 0.6230
LI	 0.9530	 0.6370
LJ	 0.8720	 0.5430
LL	 0.9200	 0.6070
LM	 0.9440	 0.6200
LN	 0.9860	 0.6650
LO	 0.9610	 0.6520
LP	 0.9680	 0.6610
LQ	 0.9680	 0.6610
LR	 0.9150	 0.6010
LS	 0.9780	 0.6600
LT	 0.9420	 0.6250
LU	 0.9100	 0.5630
LV	 0.9660	 0.6590
LW	 0.6190	 0.4270
LX	 0.9440	 0.6310
LY	 0.9500	 0.6310
LZ	 0.9560	 0.6260
La	 0.9740	 0.6630
Lb	 0.8820	 0.5740
Lc	 0.9370	 0.6220
Ld	 0.9440	 0.6230
Le	 0.9640	 0.6610
Lf	 0.9680	 0.6620















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Chain	Atom inclusion	Q-score
Lg	 0.9380	 0.6320
Lh	 0.9380	 0.6260
Li	 0.9390	 0.6210
Lj	 0.9750	 0.6490
Lk	 0.8810	 0.5680
Ll	 0.9620	 0.6400
Lm	 0.9420	 0.6370
Ln	 0.8570	 0.6530
Lo	 0.9340	 0.6300
Lp	 0.9460	 0.6430
Lr	 0.9620	 0.6390
Ls	 0.1760	 0.0840
Lt	 0.1000	 0.0250
Lz	 0.0040	 -0.0120
S2	 0.9550	 0.5500
SA	 0.9280	 0.5780
SB	 0.9290	 0.6020
SC	 0.9400	 0.6090
SD	 0.8050	 0.4780
SE	 0.9380	 0.5960
SF	 0.8580	 0.5080
SG	 0.8530	 0.4970
SH	 0.8710	 0.5290
SI	 0.9230	 0.5980
SJ	 0.9180	 0.5780
SK	 0.8200	 0.4290
SL	 0.9260	 0.6230
SM	 0.5180	 0.2120
SN	 0.9480	 0.6280
SO	 0.9450	 0.6100
SP	 0.7170	 0.3660
SQ	 0.8370	 0.4930
SR	 0.8590	 0.5330
SS	 0.7790	 0.4120
ST	 0.8420	 0.4540
SU	 0.7800	 0.4550
SV	 0.9490	 0.5930
SW	 0.9640	 0.6360
SX	 0.9450	 0.6200
SY	 0.8950	 0.5430
SZ	 0.7290	 0.3690
Sa	 0.9200	 0.6100

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Chain	Atom inclusion	Q-score
Sb	 0.9200	 0.5900
Sc	 0.8190	 0.5260
Sd	 0.8850	 0.5320
Se	 0.7630	 0.4980
Sf	 0.5260	 0.2020
Sg	 0.7620	 0.3980