



Full wwPDB EM Validation Report ⓘ

Nov 9, 2024 – 08:36 PM EST

PDB ID : 6VZJ
EMDB ID : EMD-21494
Title : Escherichia coli transcription-translation complex A1 (TTC-A1) containing mRNA with a 15 nt long spacer, fMet-tRNAs at E-site and P-site, and lacking transcription factor NusG
Authors : Molodtsov, V.; Wang, C.; Su, M.; Ebright, R.H.
Deposited on : 2020-02-28
Resolution : 4.10 Å(reported)

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.dev113
MolProbity : 4.02b-467
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

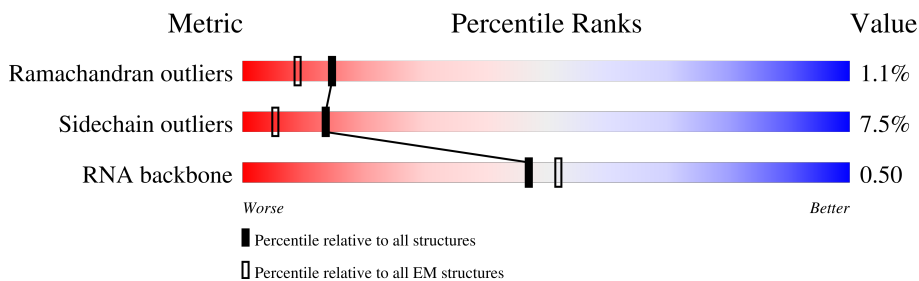
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.10 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	0	103	65% (Upper red bar) 93% (Green) 7% (Yellow)
2	1	110	44% (Upper red bar) 92% (Green) 8% (Yellow)
3	2	100	78% (Upper red bar) 89% (Green) 5% (Yellow) 6% (Grey)
4	3	104	76% (Upper red bar) 91% (Green) 8% (Yellow)
5	4	94	77% (Upper red bar) 96% (Green)
6	5	36	64% (Upper red bar) 47% (Green) 17% (Yellow) 36% (Grey)
7	6	36	75% (Upper red bar) 64% (Green) 11% (Yellow) 25% (Grey)
8	7	32	100% (Upper red bar) 25% (Green) 72% (Yellow)

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Mol	Chain	Length	Quality of chain
9	9	165	88% 54% 33% 10%
10	A	76	95% 58% 38%
10	B	76	99% 46% 49% 5%
11	AA	1342	99% 89% 8%
12	AC	329	70% 64% 5% 30%
12	AD	329	69% 69% 31%
13	AE	1407	95% 89% 5% 5%
14	C	75	67% 85% 12%
15	D	1542	27% 78% 20%
16	E	87	76% 93% 6%
17	F	71	82% 94%
18	G	241	72% 90% 7%
19	H	557	46% 41% 54%
20	I	233	76% 86% 11%
21	J	205	84% 97%
22	K	167	50% 89% 5% 7%
23	L	135	67% 72% 23%
24	M	151	83% 95% 5%
25	N	129	69% 98%
26	O	127	84% 95% 5%
27	P	99	90% 90% 10%
28	Q	117	83% 96%
29	R	123	45% 93% 6%
30	S	101	80% 95%
31	T	89	66% 85% 13%

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Mol	Chain	Length	Quality of chain
32	U	82	88% 94% 6%
33	V	84	71% 93% 5%
34	W	83	94% 95% 5%
35	X	116	89% 90% 10%
36	Y	141	99% 69% 28%
37	Z	121	25% 12% 12% 75%
38	a	2904	25% 81% 18%
39	b	76	82% 99%
40	c	78	74% 94% 5%
41	d	120	41% 86% 14%
42	e	62	74% 98%
43	f	58	69% 97%
44	g	66	95% 91% 9%
45	h	271	71% 93% 7%
46	i	56	48% 89% 11%
47	j	209	54% 97%
48	k	55	85% 89% 5% 5%
49	l	201	70% 93% 7%
50	m	46	35% 93% 7%
51	n	177	86% 90% 10%
52	o	64	81% 92% 8%
53	p	175	87% 98%
54	q	38	71% 95% 5%
55	r	149	95% 93% 7%
56	s	142	62% 96%

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Mol	Chain	Length	Quality of chain
57	t	123	<p>53% 95% 5%</p>
58	u	144	<p>71% 96% 5%</p>
59	v	136	<p>67% 96% 5%</p>
60	w	119	<p>56% 93% 7%</p>
61	x	116	<p>83% 95% 5%</p>
62	y	114	<p>81% 96% 5%</p>
63	z	117	<p>43% 97% 5%</p>

2 Entry composition [i](#)

There are 65 unique types of molecules in this entry. The entry contains 299095 atoms, of which 123940 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
1	0	103	1655	516	839	153	145	2	0	0

- Molecule 2 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
2	1	110	1779	532	922	166	156	3	0	0

- Molecule 3 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
3	2	94	1557	470	811	140	134	2	0	0

- Molecule 4 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
4	3	103	1632	498	844	148	142	0	0

- Molecule 5 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
5	4	94	1533	479	780	137	134	3	0	0

- Molecule 6 is a DNA chain called NT DNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			P
6	5	23	732	225	260	87	137	23	0	0

- Molecule 7 is a DNA chain called T DNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
7	6	27	847	259	305	89	167	27	0	0

- Molecule 8 is a RNA chain called mRNA with 27 nt long spacer.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
8	7	32	769	300	97	100	240	32	0	0

- Molecule 9 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	9	148	1117	705	196	209	7	0	0

- Molecule 10 is a RNA chain called E-site and P-site tRNA (fMet).

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	P		
10	A	76	2446	723	826	295	527	75	0	0
10	B	76	2433	723	813	295	527	75	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	U	deletion	GB 1848959854
B	?	-	U	deletion	GB 1848959854

- Molecule 11 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
11	AA	1322	20851	6539	10426	1817	2026	43	0	0

- Molecule 12 is a protein called DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
12	AC	230	3599	1112	1813	317	351	6	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
12	AD	228	3556	1100	1789	312	349	6	0	0

- Molecule 13 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
13	AE	1335	21000	6526	10612	1854	1958	50	0	0

- Molecule 14 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
14	C	66	1103	344	559	102	97	1	0	0

- Molecule 15 is a RNA chain called 16S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			P
15	D	1524	49126	14585	16423	6003	10591	1524	0	0

- Molecule 16 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
16	E	86	1388	414	719	138	114	3	0	0

- Molecule 17 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
17	F	70	1218	366	629	125	97	1	0	0

- Molecule 18 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
18	G	225	3545	1113	1785	316	323	8	0	0

- Molecule 19 is a protein called 30S ribosomal protein S1.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
19	H	259	3184	1073	1454	305	349	3	0	0

- Molecule 20 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
20	I	208	3346	1036	1710	307	290	3	0	0

- Molecule 21 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
21	J	205	3350	1026	1707	315	298	4	0	0

- Molecule 22 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
22	K	156	2348	717	1196	217	212	6	0	0

- Molecule 23 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
23	L	104	1694	536	846	153	152	7	0	0

- Molecule 24 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
24	M	151	2416	735	1235	227	215	4	0	0

- Molecule 25 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
25	N	129	2010	616	1031	173	184	6	0	0

- Molecule 26 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
26	O	127	2092	634	1070	206	179	3	0	0

- Molecule 27 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
27	P	99	1621	495	831	151	143	1	0	0

- Molecule 28 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
28	Q	117	1764	540	887	174	160	3	0	0

- Molecule 29 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
29	R	121	1940	580	1001	194	161	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
30	S	100	1649	499	844	164	139	3	0	0

- Molecule 31 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
31	T	88	1448	439	734	144	130	1	0	0

- Molecule 32 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
32	U	82	1315	406	666	128	114	1	0	0

- Molecule 33 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
33	V	80	1339	411	691	121	113	3	0	0

- Molecule 34 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
34	W	83	1351	424	688	126	111	2	0	0

- Molecule 35 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
35	X	116	1864	558	964	181	158	3	0	0

- Molecule 36 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	Y	141	1032	651	179	196	6	0	0

- Molecule 37 is a protein called 50S ribosomal protein L7/L12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	Z	30	227	144	33	47	3	0	0

- Molecule 38 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			P
38	a	2880	92918	27587	31077	11398	19976	2880	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	887	A	U	conflict	GB 937521852

- Molecule 39 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
39	b	76	1181	360	599	117	104	1	0	0

- Molecule 40 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
40	c	77	1277	388	652	129	106	2	0	0

- Molecule 41 is a RNA chain called 5S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			P
41	d	120	3870	1144	1301	468	837	120	0	0

- Molecule 42 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
42	e	62	1032	308	531	98	94	1	0	0

- Molecule 43 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
43	f	58	936	281	488	87	78	2	0	0

- Molecule 44 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
44	g	66	1042	323	520	99	94	6	0	0

- Molecule 45 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
45	h	271	4236	1288	2154	423	364	7	0	0

- Molecule 46 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
46	i	56	903	269	459	94	80	1	0	0

- Molecule 47 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
47	j	209	3182	979	1617	288	294	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
48	k	52	890	275	464	78	73		0	0

- Molecule 49 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
49	l	201	3171	974	1619	283	290	5	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
50	m	46	795	228	418	90	57	2	0	0

- Molecule 51 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
51	n	177	2853	899	1443	249	256	6	0	0

- Molecule 52 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
52	o	64	1076	323	572	105	74	2	0	0

- Molecule 53 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
53	p	175	2671	826	1358	241	244	2	0	0

- Molecule 54 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
54	q	38	645	185	343	65	48	4	0	0

- Molecule 55 is a protein called 50S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
55	r	149	2259	699	1148	197	214	1	0	0

- Molecule 56 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
56	s	142	2291	714	1162	212	199	4	0	0

- Molecule 57 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
57	t	123	1969	593	1023	181	166	6	0	0

- Molecule 58 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
58	u	144	2182	654	1129	207	190	2	0	0

- Molecule 59 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
59	v	136	2231	686	1157	205	177	6	0	0

- Molecule 60 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
60	w	119	1945	588	994	195	163	5	0	0

- Molecule 61 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
61	x	116	1815	552	923	178	162	0	0

- Molecule 62 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			S
62	y	114	1879	574	962	179	163	1	0	0

- Molecule 63 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	H	N	O		
63	z	117	1967	604	1020	192	151	0	0

- Molecule 64 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
64	AE	1	Total	Mg	0
			1	1	

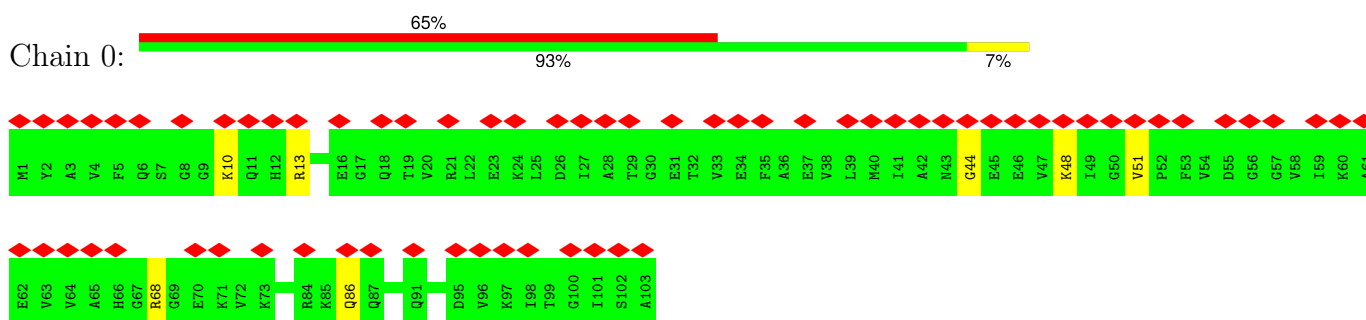
- Molecule 65 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
65	AE	2	Total	Zn	0
			2	2	

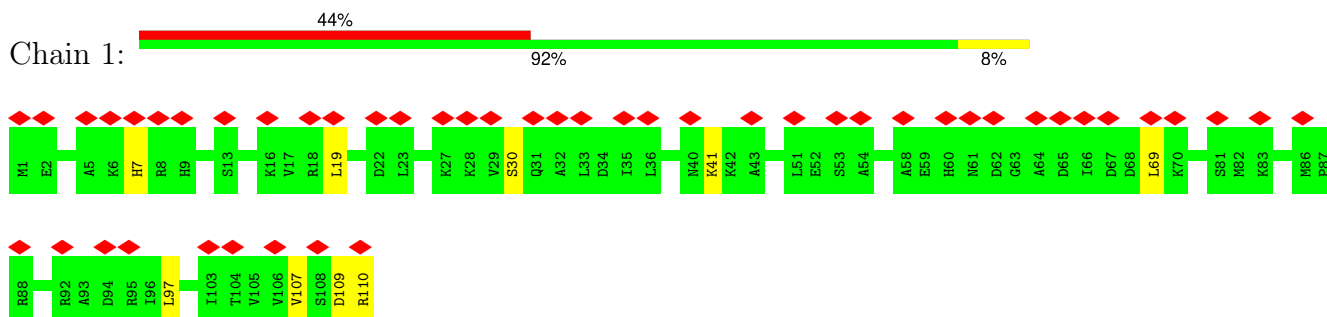
3 Residue-property plots [i](#)

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.

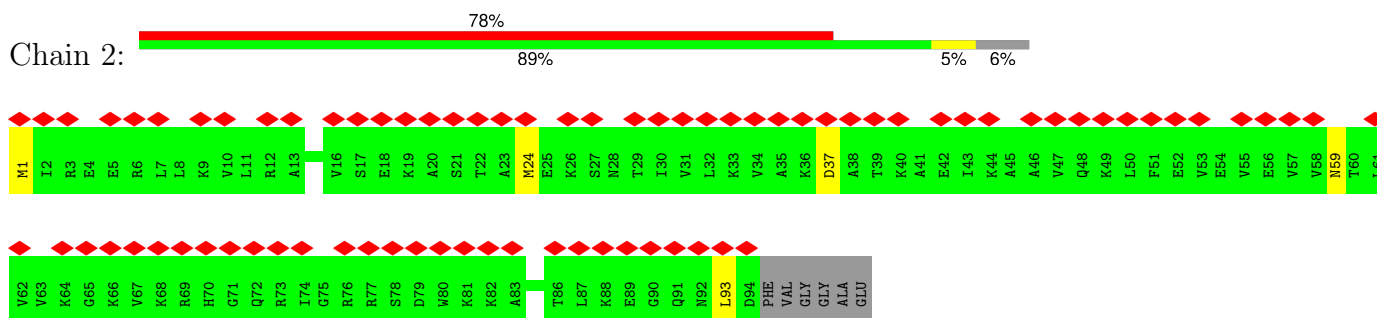
- Molecule 1: 50S ribosomal protein L21



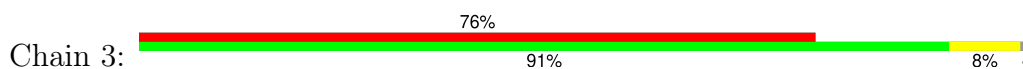
- Molecule 2: 50S ribosomal protein L22

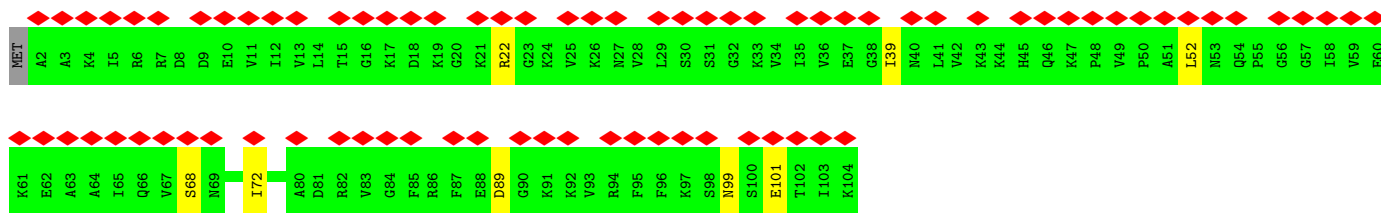


- Molecule 3: 50S ribosomal protein L23

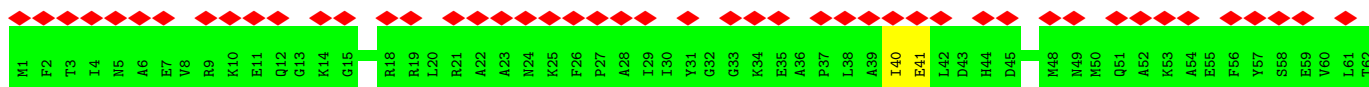
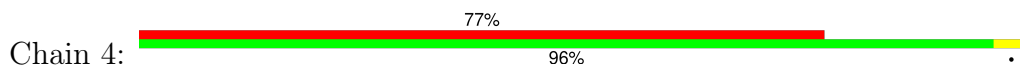


- Molecule 4: 50S ribosomal protein L24

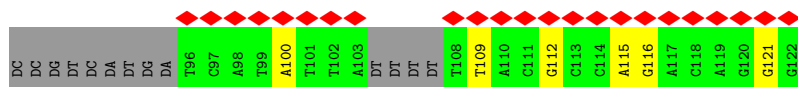




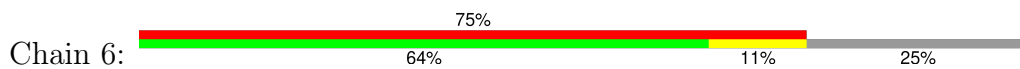
• Molecule 5: 50S ribosomal protein L25



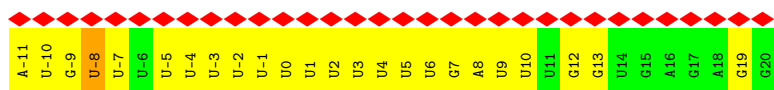
• Molecule 6: NT DNA



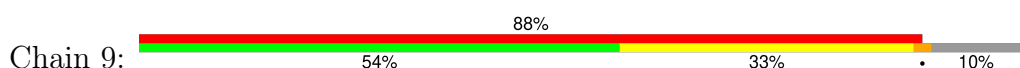
• Molecule 7: T DNA



• Molecule 8: mRNA with 27 nt long spacer

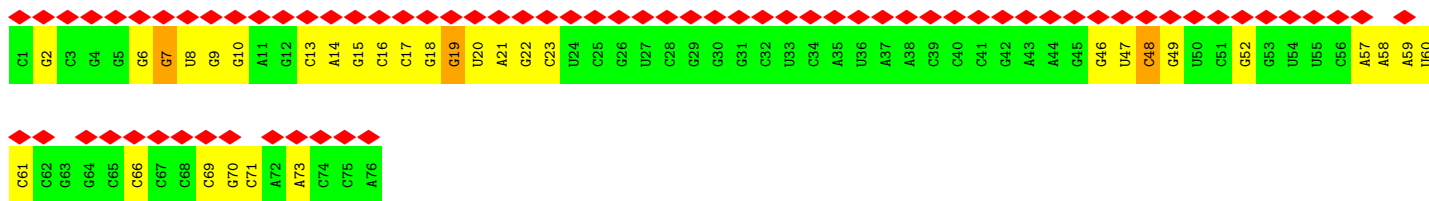


• Molecule 9: 50S ribosomal protein L10

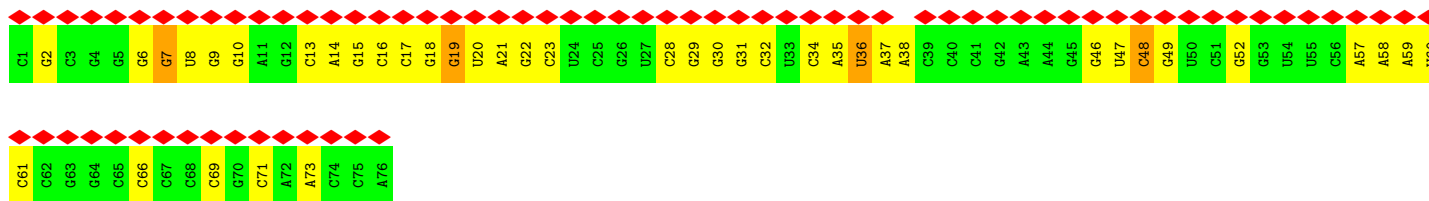




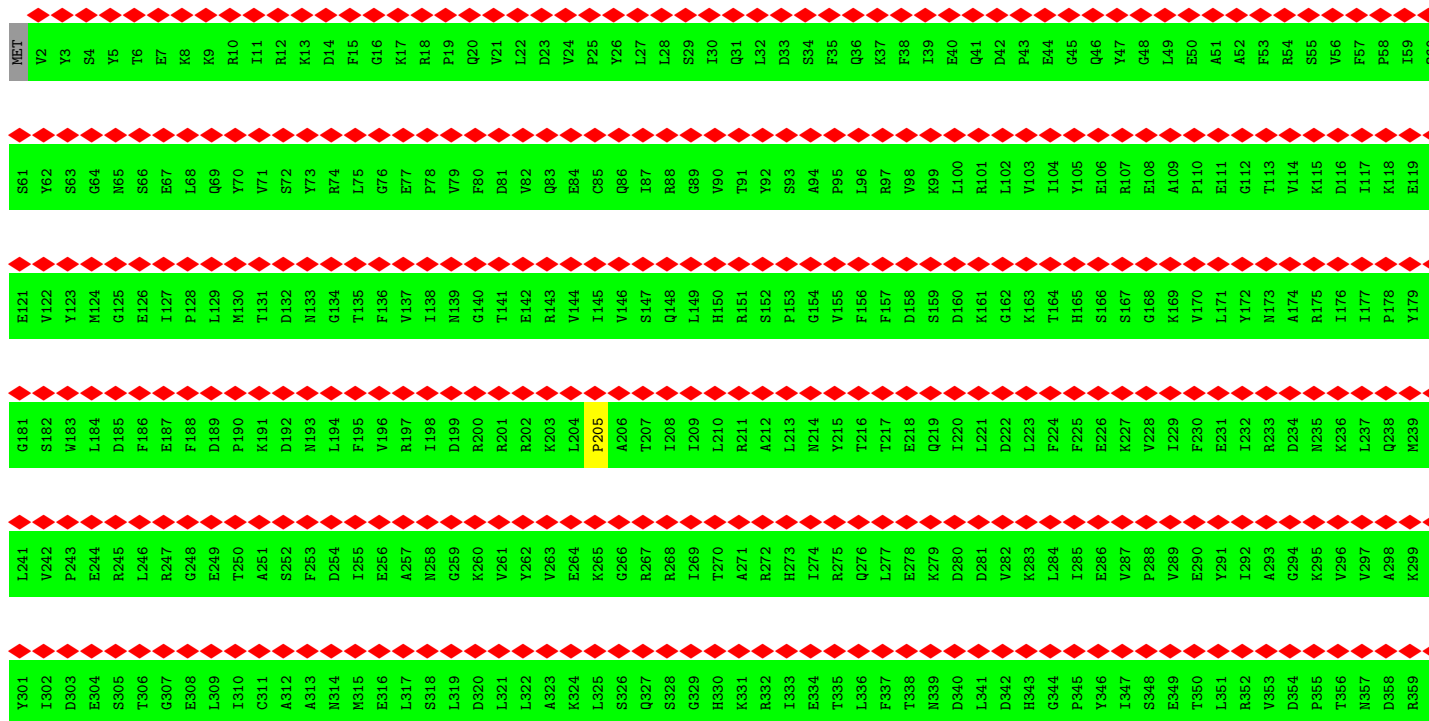
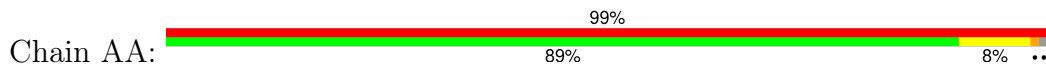
• Molecule 10: E-site and P-site tRNA (fMet)



• Molecule 10: E-site and P-site tRNA (fMet)



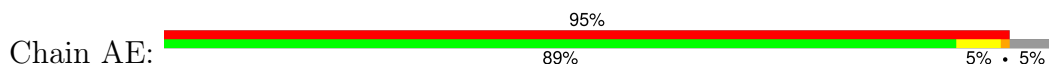
• Molecule 11: DNA-directed RNA polymerase subunit beta



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L363	D423	D483	A543	I603	V663	V723	L783	T843	ARG	E962	H1023	E1083
V364	D424	L484	G544	H604	G664	V724	A784	K844	ALA	E963	E1024	D1084
E365	I425	D485	F445	Y605	A665	Q725	F785	L845	PHE	Q965	F1025	M1085
I366	I426	T486	F546	L606	S666	Q726	G786	G846	GLY	I966	E1026	P1086
Y367	D427	L487	V547	S607	L667	V727	P787	P847	GLY	L967	K1027	Y1087
R368	V428	M488	R548	A608	I668	D728	S788	E848	ALA	E968	K1028	D1088
M369	M429	P489	D549	I609	P669	A729	T789	E849	S911	A969	L1029	E1089
M370	K430	Q490	V550	E610	F670	S730	D790	L850	D912	G970	E1030	N1090
R371	K431	D491	H551	E611	L671	R731	L791	T851	V913	L971	A1031	G1091
P372	L432	M492	P552	G612	E672	I732	G792	A852	K914	F972	K1032	T1092
G373	I433	I493	T553	M613	H673	V733	E793	D853	D915	S973	R1033	P1093
E374	D434	N494	H554	Y614	D674	I734	L794	L854	S916	R974	R1034	N1094
P375	I435	A495	Y555	V615	D675	K735	A795	P855	S917	I975	K1035	D1095
P376	R436	K496	G556	I616	A676	V736	L796	N856	L918	R976	I1036	I1096
T377	M437	R497	R557	A617	N677	M737	G797	V857	R919	A977	T1037	Y1097
R378	G438	I498	V558	Q618	R678	E738	Q798	G858	V920	V978	Q1038	L1098
E379	K439	S499	C559	A619	A679	D739	M799	E859	P921	L979	G1039	N1099
A380	G440	A500	P560	N620	L680	E740	M800	A860	I922	V980	D1040	P1100
A381	E441	A501	I561	S621	M681	M741	R601	A861	G923	A981	D1041	L1101
E382	V442	V502	E562	N622	G682	V742	V602	L862	V924	E982	L1042	G1102
S383	D443	K503	T563	L623	A683	F743	A603	S863	S925	G983	A1043	V1103
L384	D444	E504	P564	D624	N684	G744	F904	K864	G926	V984	P1044	P1104
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R394	R454	F514	S574	V634	R694	T754	D814	G874	R936	R994	L1054	L1114
Y395	S455	M515	L575	T635	A695	K755	S615	A875	D937	D995	A1055	T1115
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G401	E461	L521	T581	G641	G701	Q761	R621	D881	R943	G1001	Q1061	A1121
R402	M462	S522	N582	S642	T702	M762	V622	L882	R944	L1002	P1062	A1122
M403	Q463	E523	E583	S643	G703	T763	G623	L883	A945	T1003	G1063	G1123
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R411	V471	S531	Y591	D651	D711	V771	I631	G891	L953	L1011	G1071	M1131
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I414	A474	G534	V594	D654	V714	G774	Q634	LEU	A956	L1014	G1074	Q1134
E415	V475	P535	T595	V655	T715	E775	E635	THR	K957	A1015	V1075	Q1135
G416	K476	G536	D596	S656	A716	P776	L836	PRD	K958	I1016	I1076	Q1136
S417	E477	G537	G597	T657	V717	V777	A837	GLU	D959	S1017	S1077	E1137
G418	R478	L538	V598	Q658	A718	E778	C838	GLU	L960	Q1018	K1078	L1138
I419	L479	T539	V599	Q659	K719	R779	V639	LYS		D1019	I1079	A1139
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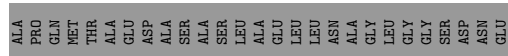
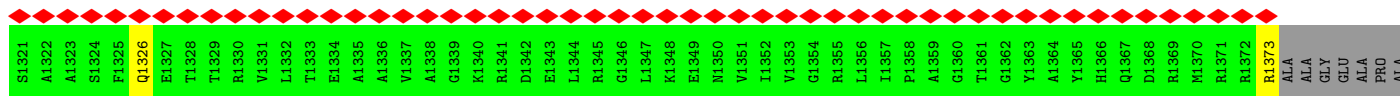
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C131	R191	GLY
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L133	E193	LEU
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• Molecule 13: DNA-directed RNA polymerase subunit beta'

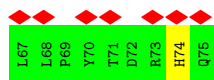
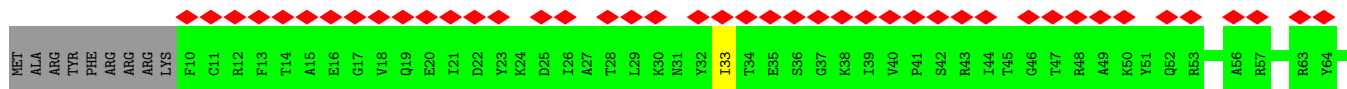
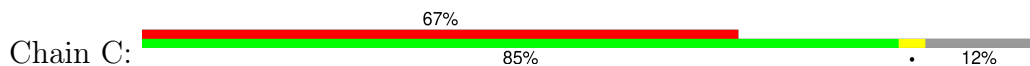


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LEU	I22	THR
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ALA	A25	ALA
GLM	S26	ALA
THR	P27	LEU
THR	D28	LEU
LYS	M29	ALA
LYS	I30	ALA
LEU	R31	ILE
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LEU	W33	TVR
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LEU	E37	ASP
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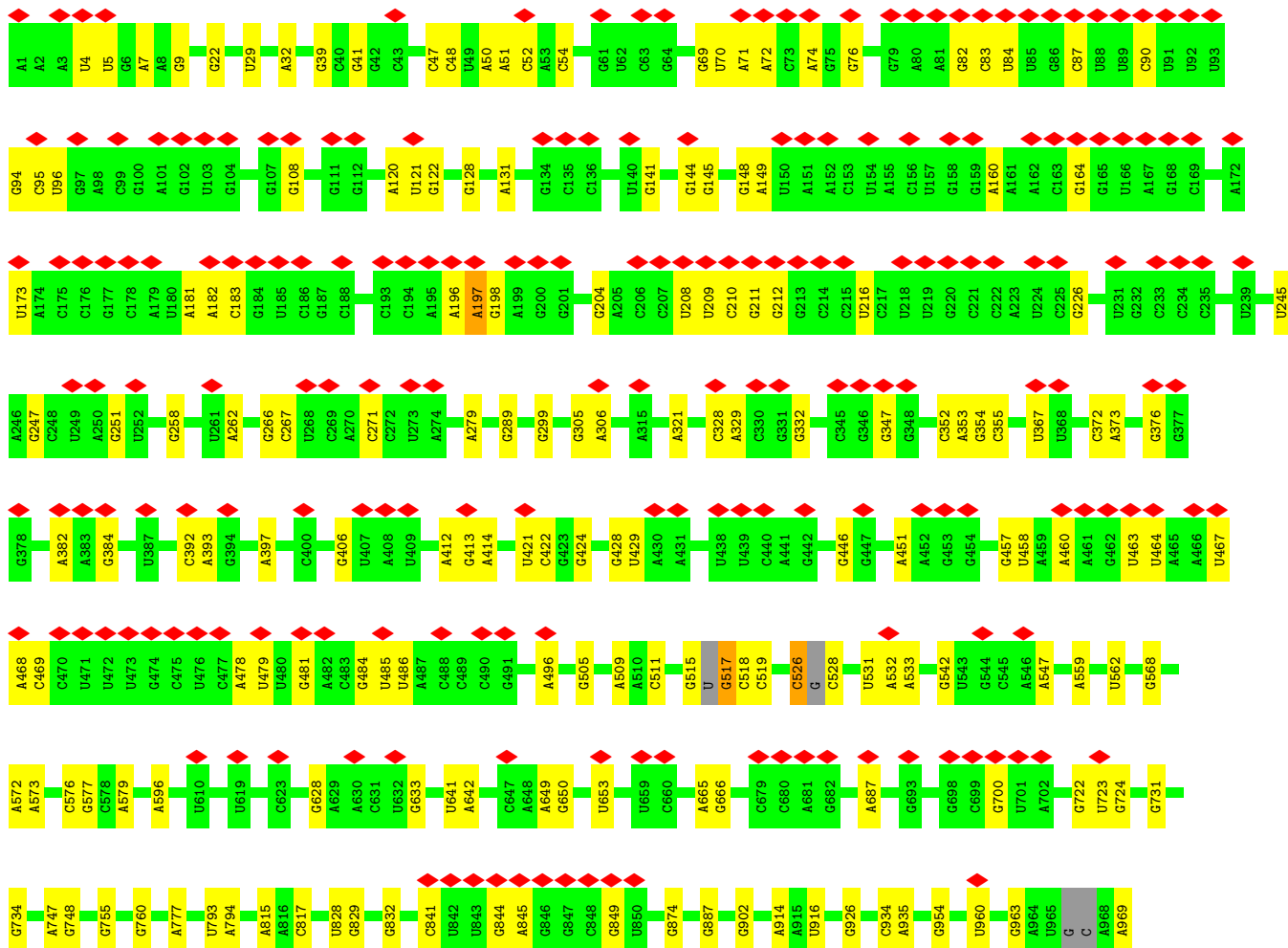
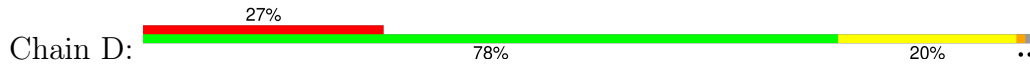
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L644	K604	M604	E663	Y723	L783	V843	L903	V963	H1023	A1083	D1143	R1203	K1263
H645	L605	M605	I664	M724	A784	T844	A904	K964	T1024	Q1084	L1144	V1204	A1264
A646	L606	L606	Q665	M725	D785	A845	R905	S965	M1025	G1085	F1145	E1205	T1265
R647	T607	N606	Q666	A726	T786	E846	G906	V966	P1026	M1086	E1146	R1206	I1266
V648	C608	C608	F668	D727	A787	D847	H907	V967	V1027	D1087	A1147	G1207	V1267
K649	Y609	Y609	Q669	S728	L788	V848	1908	N968	I1028	V1088	R1148	D1208	M1268
V650	R610	R610	S670	G729	K789	L849	1909	S969	L1029	L1089	R1149	L1209	A1269
R651	I611	I611	G671	A730	T790	K850	N910	S970	E1030	I1090	P1150	I1210	G1270
I652	L612	L612	L672	R731	A791	P851	K911	G971	V1031	P1091	K1151	S1211	S1271
T653	G613	G613	L673	G732	N792	G852	G912	K972	S1032	G1093	E1152	D1212	S1272
E654	L614	L614	T674	A733	S793	T853	E913	L973	G1033	T1093	P1153	D1213	D1273
Y655	K615	K615	A675	A734	G794	A854	A914	V974	F1034	D1094	A1154	P1214	F1274
E656	P616	P616	G676	A735	Y795	D855	1915	1975	V1035	M1095	I1155	E1215	L1275
K657	T617	T617	E677	Q736	L796	I856	G916	T976	R1036	P1096	L1156	A1216	E1276
D658	R618	R618	R678	I737	T797	L857	V917	S977	F1037	A1097	A1157	G1217	G1277
A659	I619	I619	Y679	R738	R798	V858	1918	R978	T1038	Q1098	E1158	H1218	E1278
N660	F620	F620	M680	Q739	R799	P859	A919	N979	D1039	Y1099	I1159	D1219	Q1279
G661	A621	A621	K681	L740	L800	R860	A920	T980	M1040	F1100	S1160	I1220	V1280
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V664	I624	I624	D684	R744	A804	L864	G924	L984	Q1044	K1104	S1164	R1224	R1284
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L669	F629	F629	A689	K749	V809	C869	Q929	G989	Q1049	L1109	T1169	V1229	M1289
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V673	A633	A633	V693	S753	D813	E873	R933	E993	L1053	V1113	V1173	I1233	E1293
V674	R634	R634	A694	I754	C814	E874	THR	S994	T1054	V1114	R1174	V1234	A1294
G675	S635	S635	K695	I755	G815	N875	PHE	Y995	G1055	I1115	L1175	M1235	M1295
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M681	I641	I641	L701	A761	M821	K801	ALA	A1001	V1061	L1121	D1181	Y1241	T1301
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V683	D643	D643	T703	F763	T823	R883	ALA	R883	L1003	R1123	S1183	L1243	S1303
P684	M644	M644	E704	R764	P824	S884	ALA	S884	A1004	I1124	D1184	Q1244	R1304
K685	V645	V645	T705	E765	V825	V885	GLU	V885	A1005	P1125	P1185	G1245	D1305
G686	V646	V646	W706	G766	I826	V886	S949	S949	G1006	K1006	Y1186	V1246	L1306
L687	P647	P647	I707	L767	E827	S887	1950	D1007	R1007	D1007	E1187	K1247	L1307
P688	E648	E648	N708	N768	G828	C888	Q951	G1008	T1068	G1008	E1188	I1248	G1308
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S690	K650	K650	D710	L770	R830	T990	K953	Q1010	Q1070	Q1010	I1190	D1250	T1310
I691	H651	H651	G711	Q771	V831	D891	N954	V1011	G1071	V1011	P1191	K1251	K1311
V692	E652	E652	Q712	F772	K932	F992	K955	A1012	K1072	A1012	K1192	H1252	A1312
N693	L653	L653	E713	F773	E833	G893	G956	G1013	D1073	G1013	M1193	I1253	S1313
Q694	I654	I654	A714	I774	V834	V894	S957	V894	L1074	L1074	R1194	E1254	L1314
A695	S655	S655	K715	S775	C835	C895	1968	E1015	R1075	E1015	Q1195	V1255	A1315
L696	E656	E656	Q716	T776	L836	A896	K959	T1016	P1076	T1016	L1196	I1256	T1316
G697	A657	A657	V717	H777	R837	H897	L960	V1017	A1077	V1017	M1197	V1257	E1317
K698	S718	S718	S718	G778	D838	C898		C898	A1018	A1018	V1198	R1258	S1318
K699	A659	A659	F719	A779	V839	Y899		Y899	M1019	M1019	F1199	Q1259	F1319
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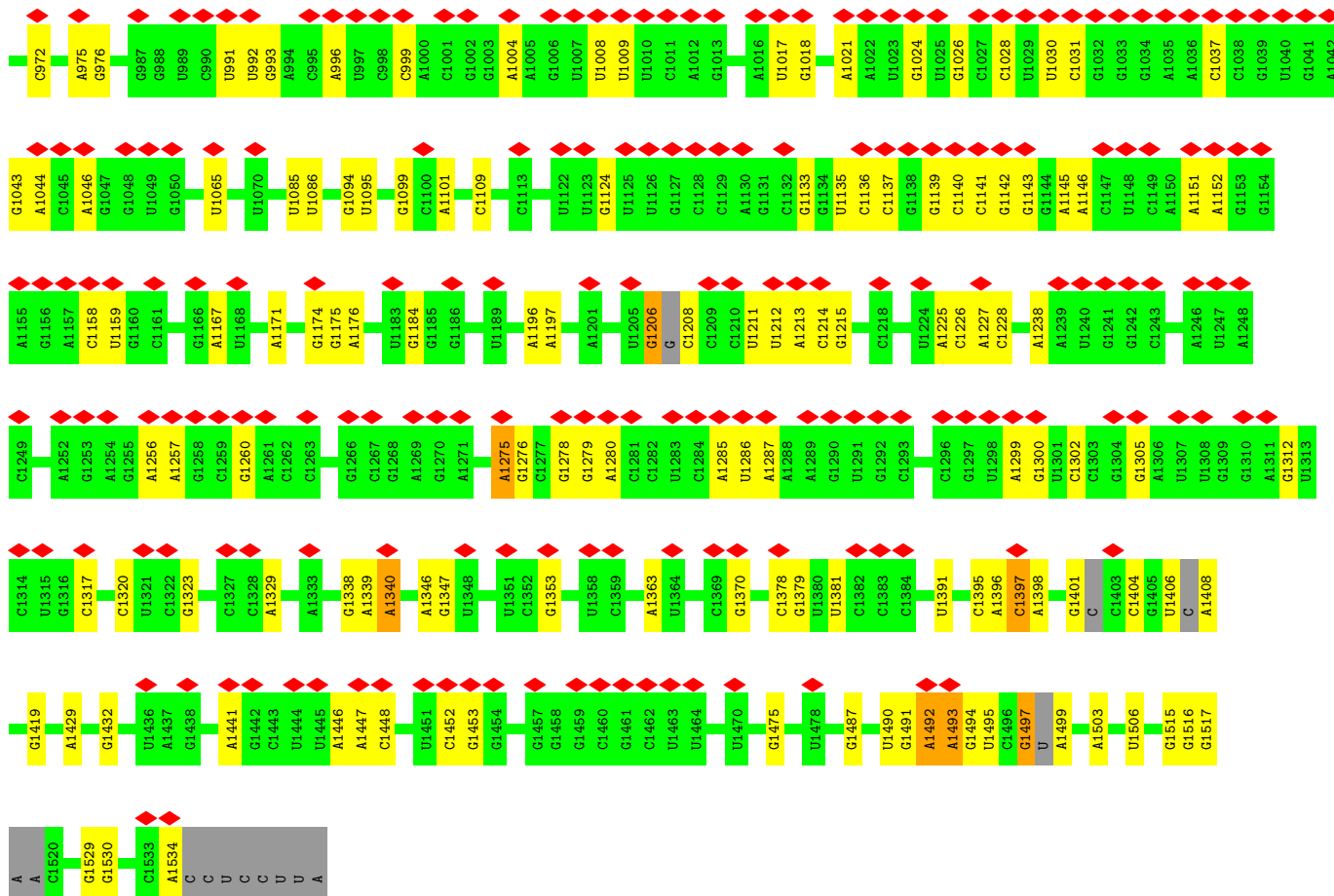


• Molecule 14: 30S ribosomal protein S18

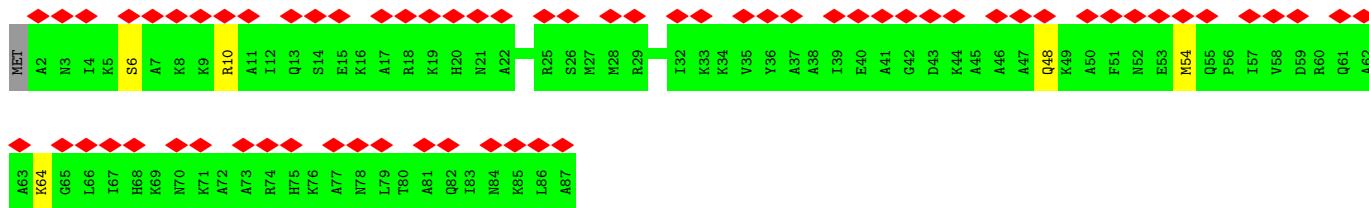
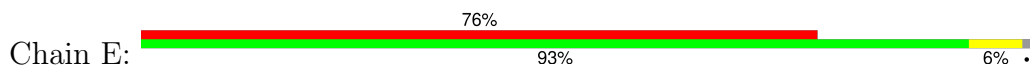


• Molecule 15: 16S rRNA

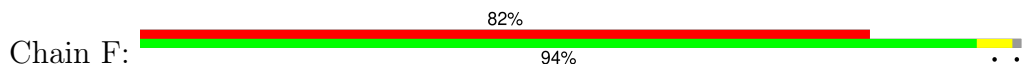




• Molecule 16: 30S ribosomal protein S20

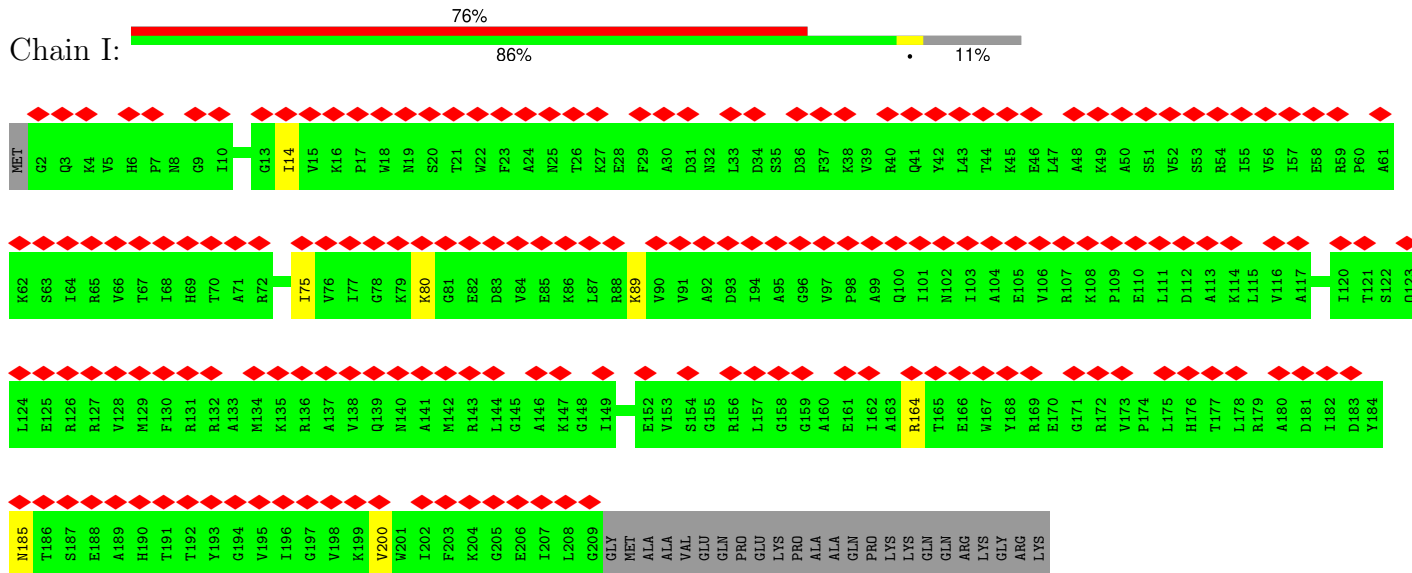


• Molecule 17: 30S ribosomal protein S21

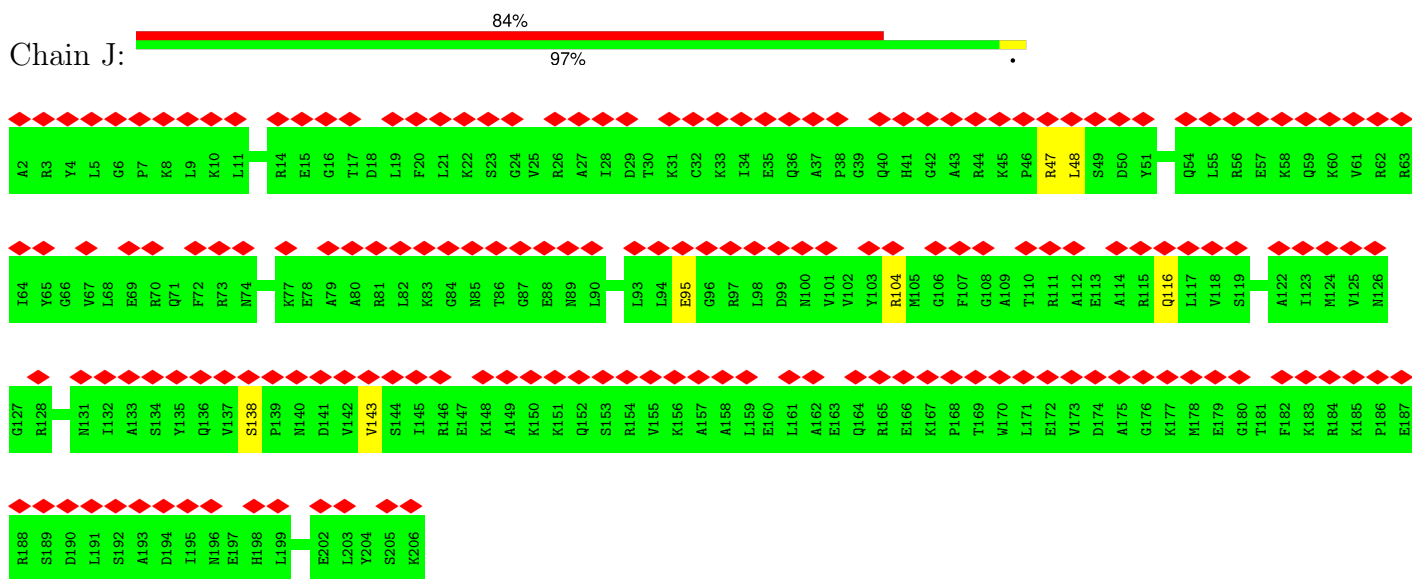


• Molecule 18: 30S ribosomal protein S2

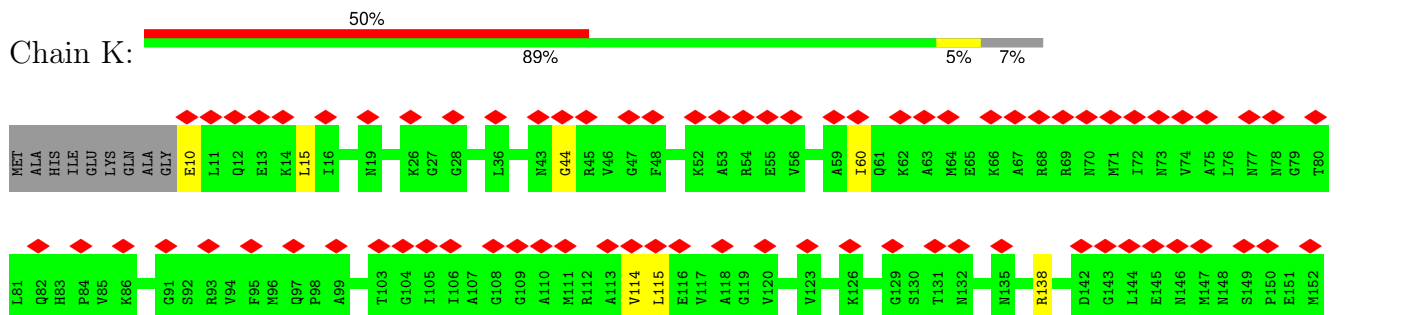
- Molecule 20: 30S ribosomal protein S3



- Molecule 21: 30S ribosomal protein S4

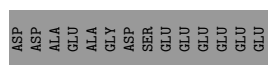
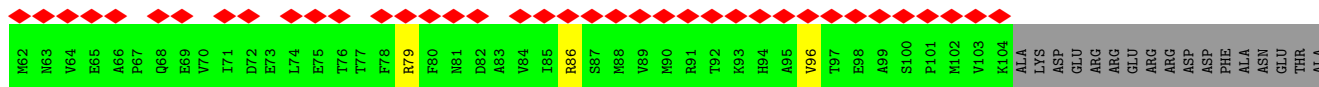
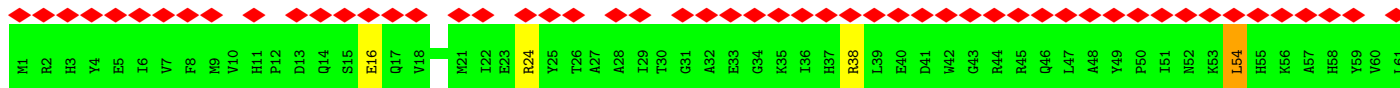


- Molecule 22: 30S ribosomal protein S5

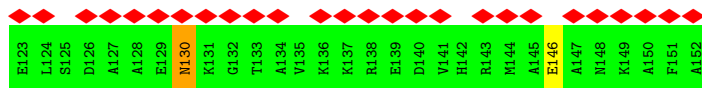
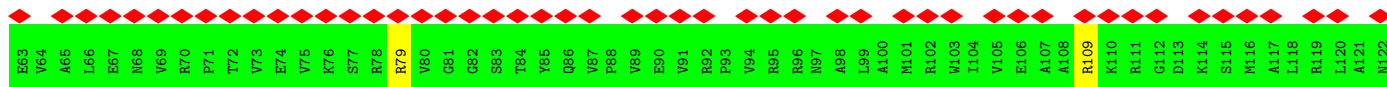
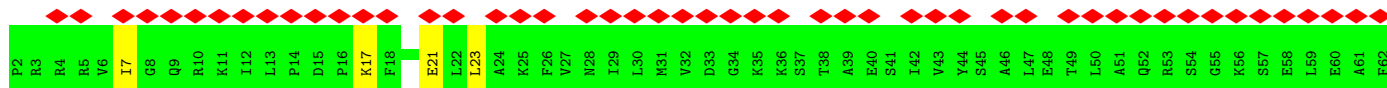
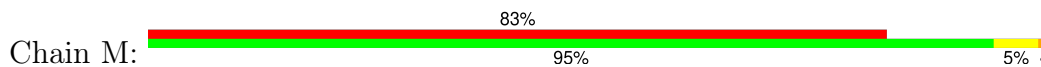




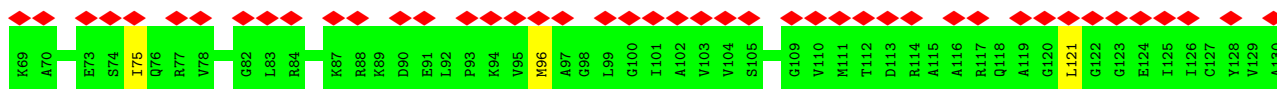
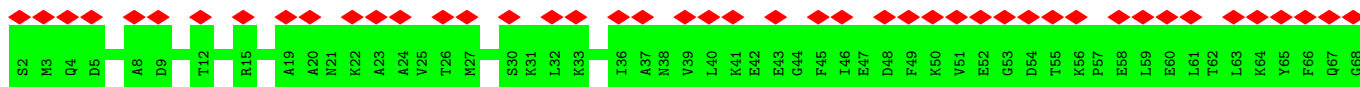
• Molecule 23: 30S ribosomal protein S6



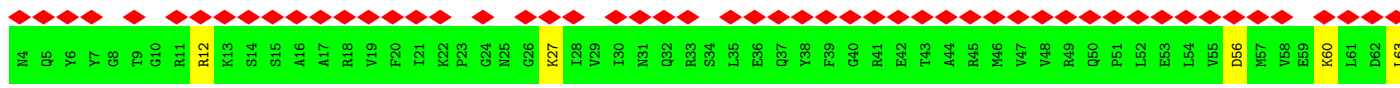
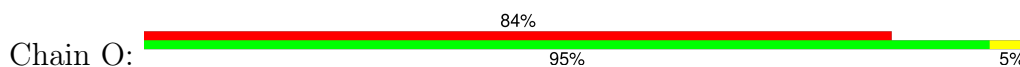
• Molecule 24: 30S ribosomal protein S7

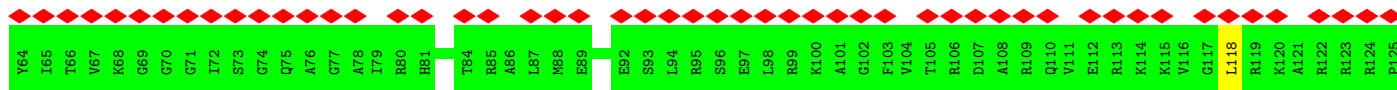


• Molecule 25: 30S ribosomal protein S8

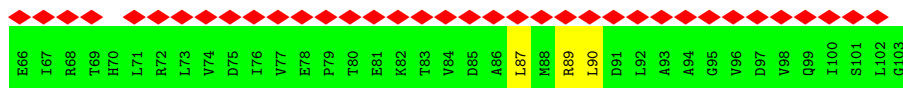
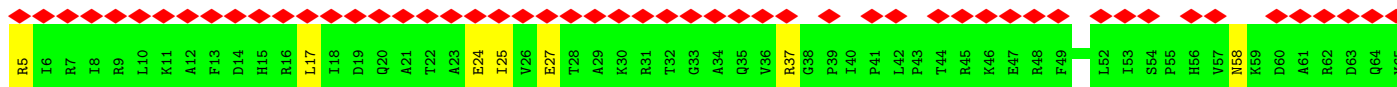
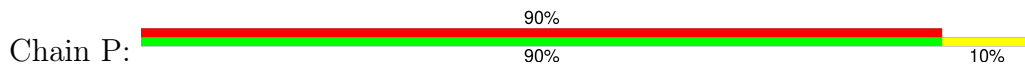


• Molecule 26: 30S ribosomal protein S9

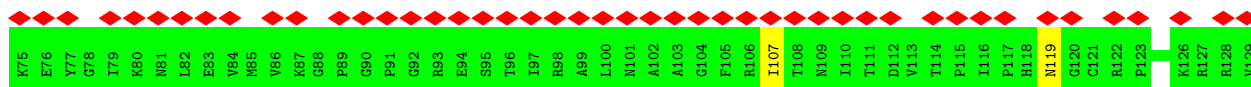
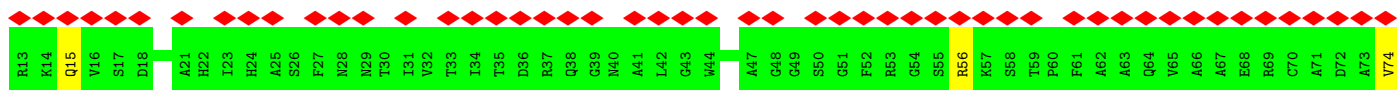
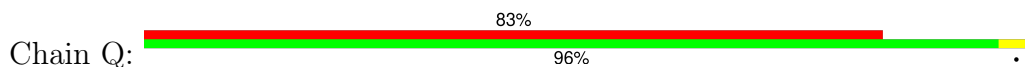




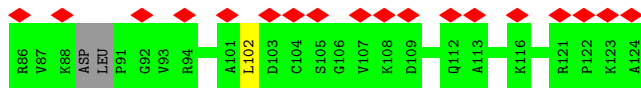
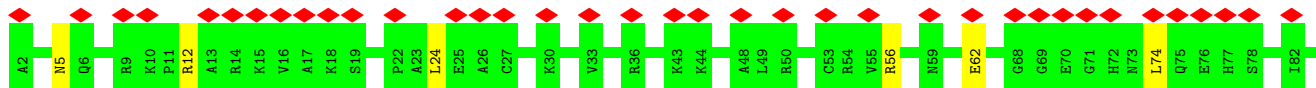
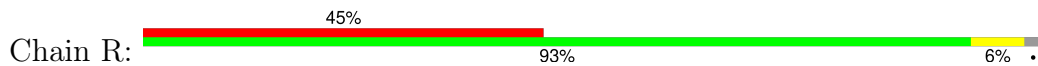
• Molecule 27: 30S ribosomal protein S10



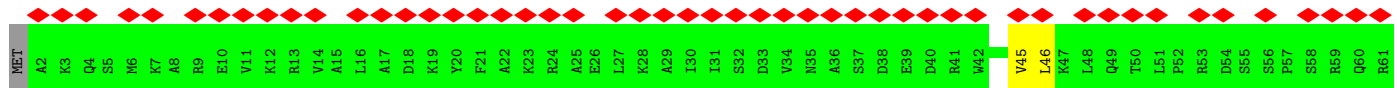
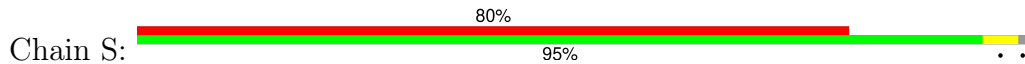
• Molecule 28: 30S ribosomal protein S11

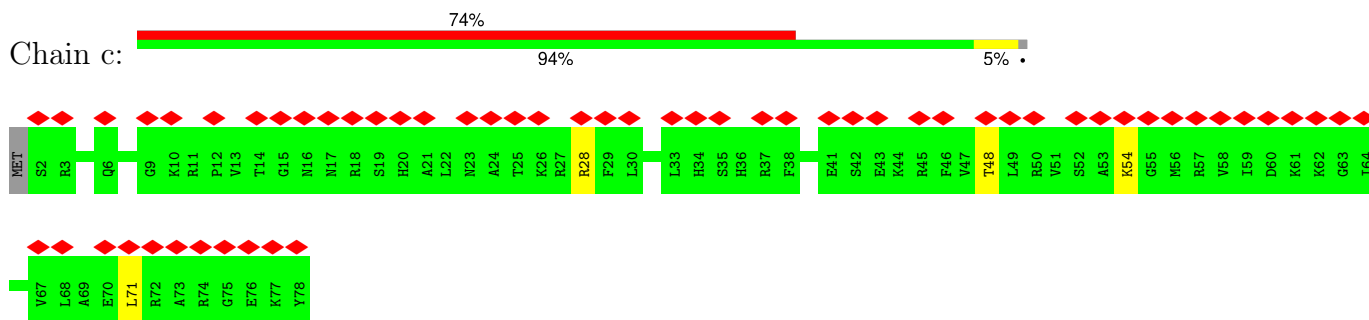


• Molecule 29: 30S ribosomal protein S12

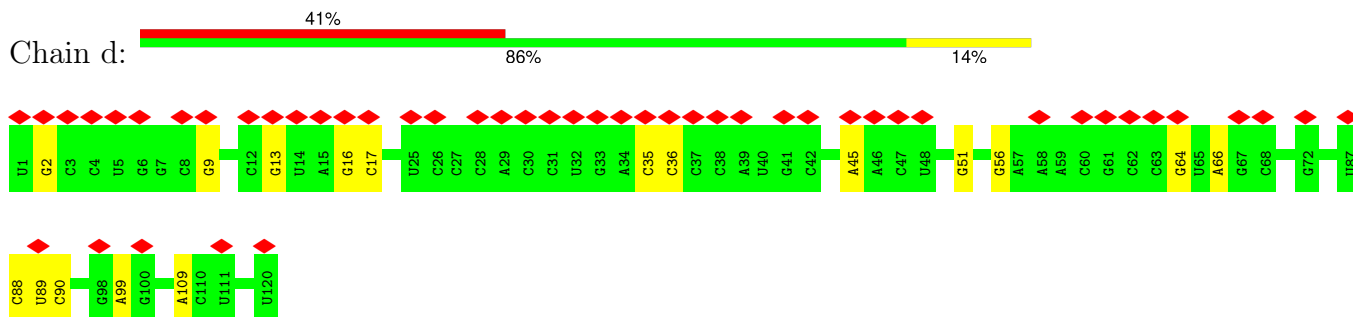


• Molecule 30: 30S ribosomal protein S14

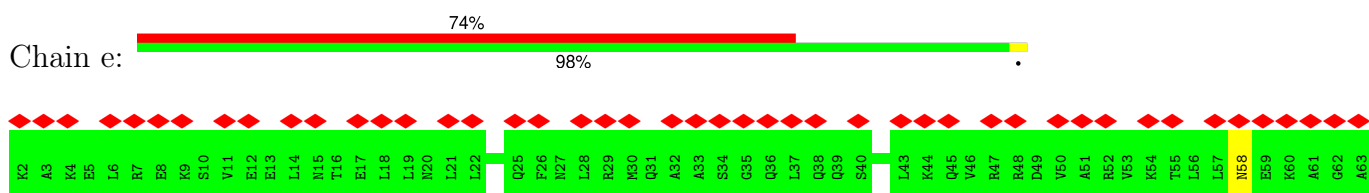




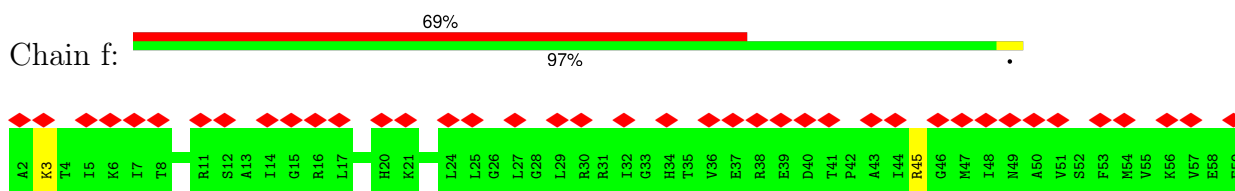
• Molecule 41: 5S rRNA



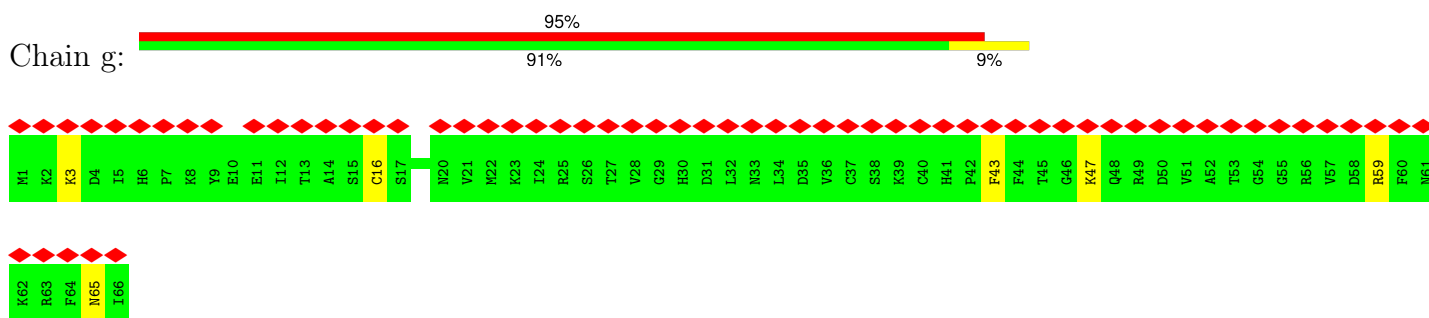
• Molecule 42: 50S ribosomal protein L29



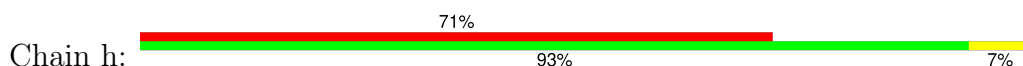
• Molecule 43: 50S ribosomal protein L30

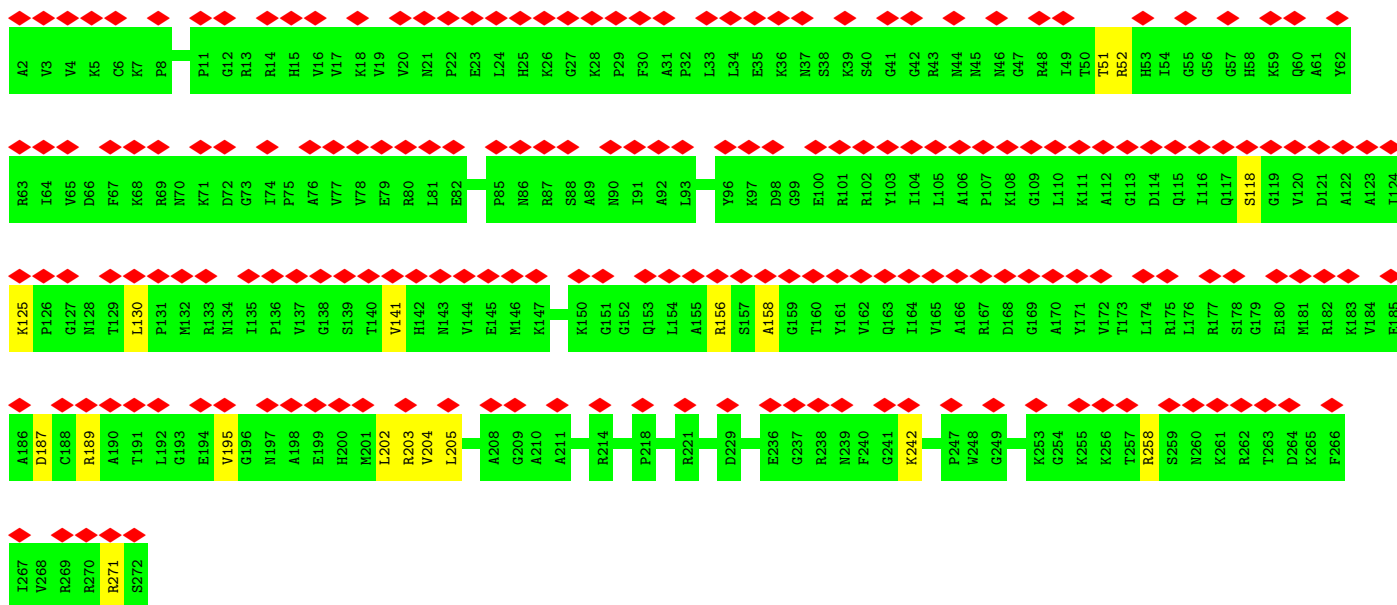


• Molecule 44: 50S ribosomal protein L31

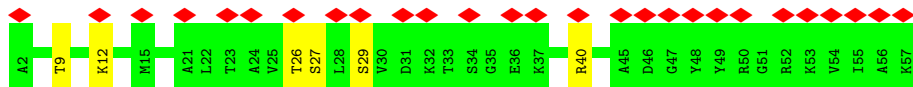
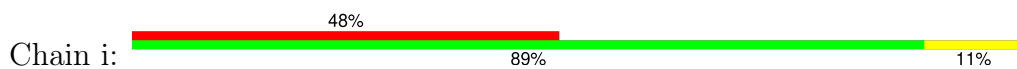


• Molecule 45: 50S ribosomal protein L2

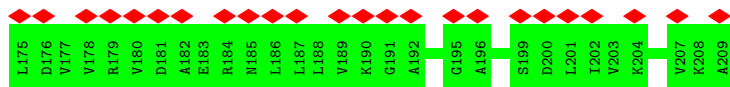
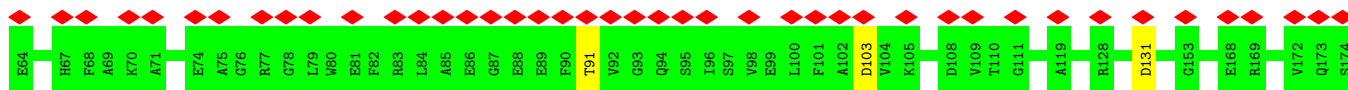




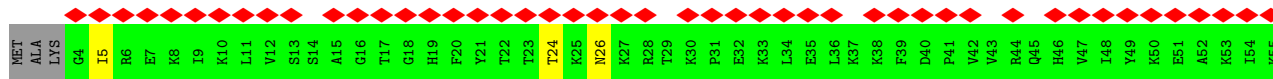
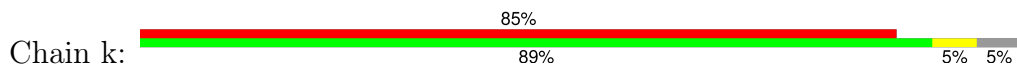
• Molecule 46: 50S ribosomal protein L32



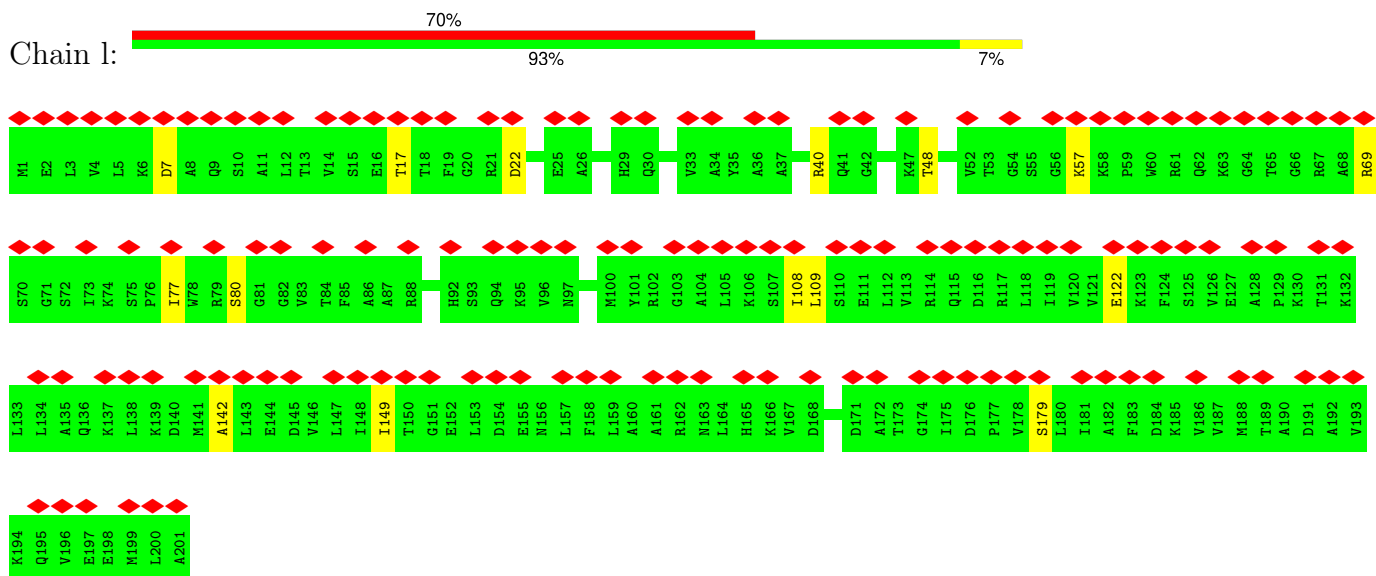
• Molecule 47: 50S ribosomal protein L3



• Molecule 48: 50S ribosomal protein L33



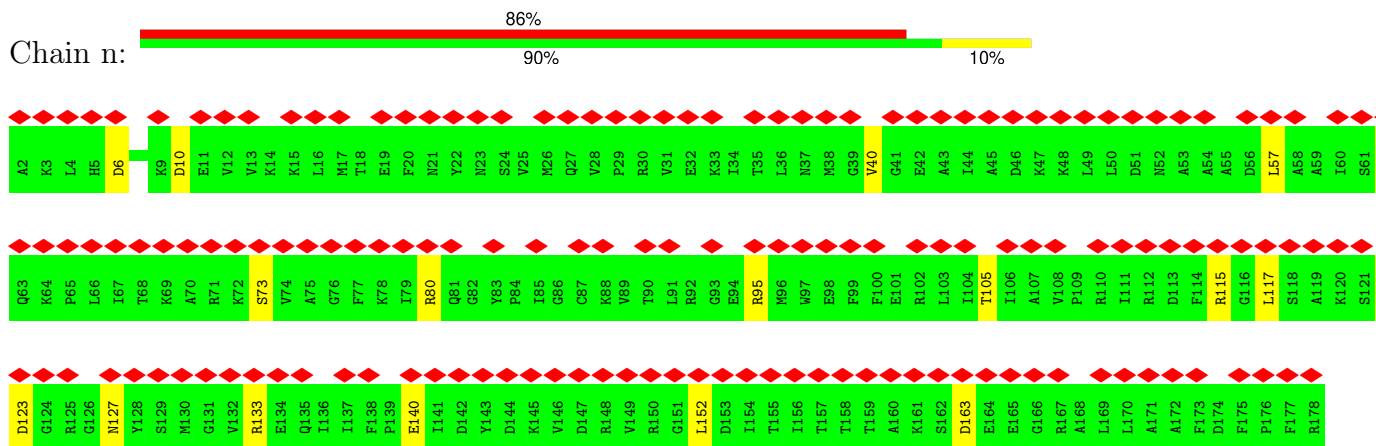
• Molecule 49: 50S ribosomal protein L4



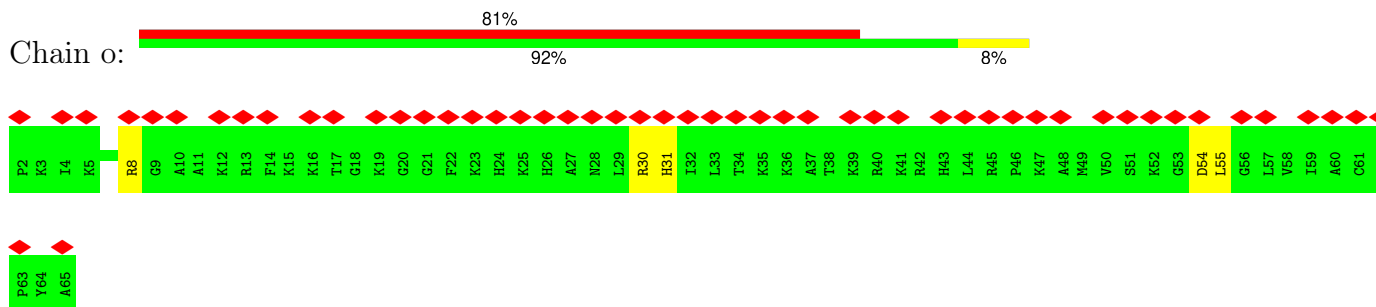
- Molecule 50: 50S ribosomal protein L34



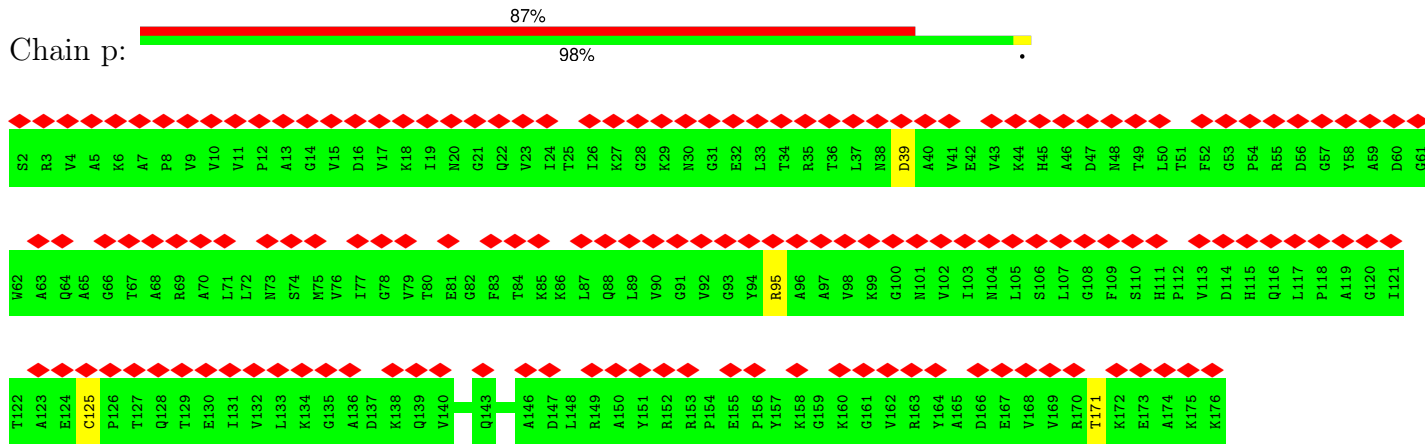
- Molecule 51: 50S ribosomal protein L5



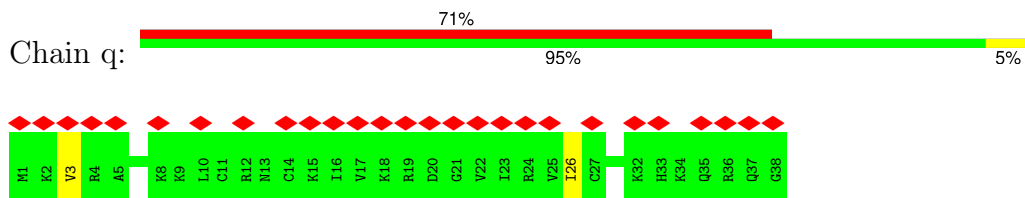
- Molecule 52: 50S ribosomal protein L35



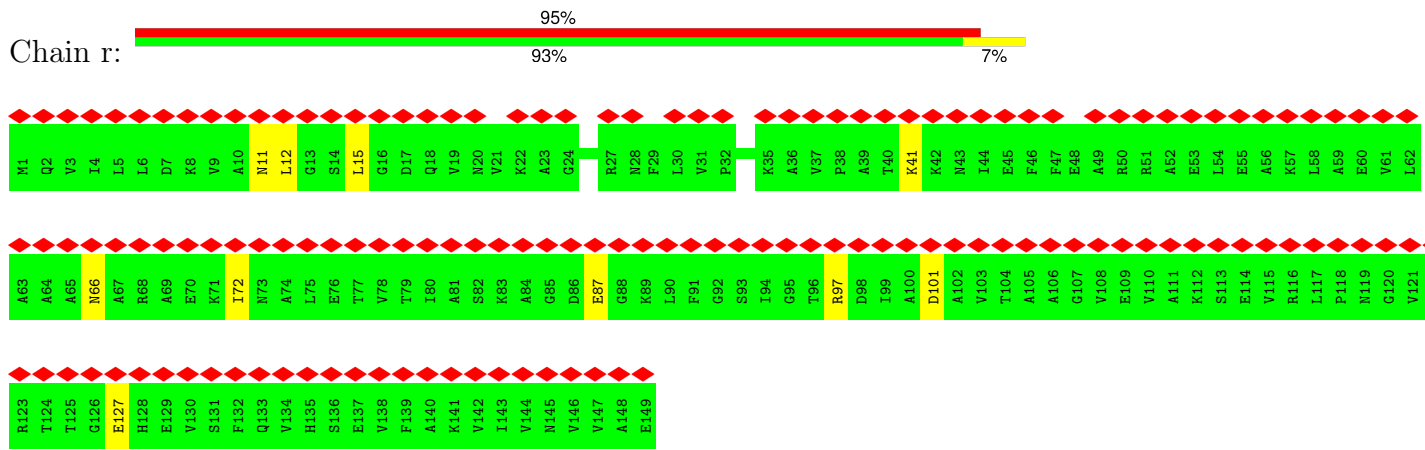
• Molecule 53: 50S ribosomal protein L6



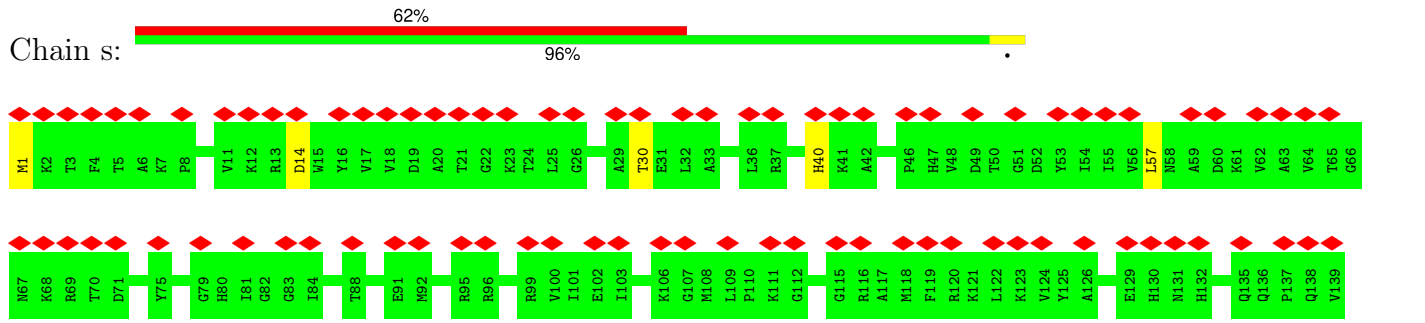
• Molecule 54: 50S ribosomal protein L36



• Molecule 55: 50S ribosomal protein L9



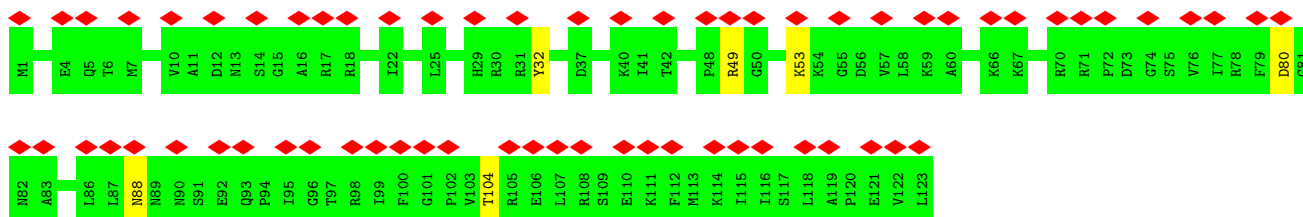
• Molecule 56: 50S ribosomal protein L13





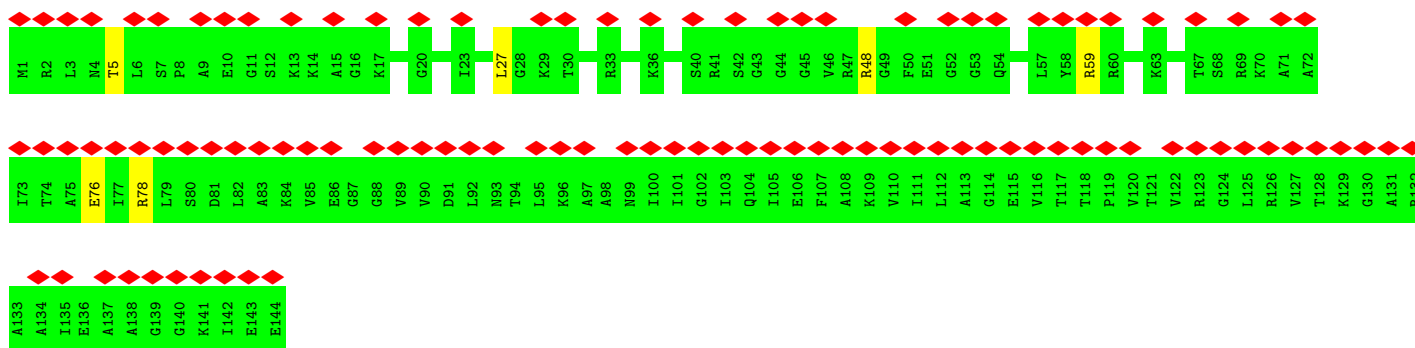
- Molecule 57: 50S ribosomal protein L14

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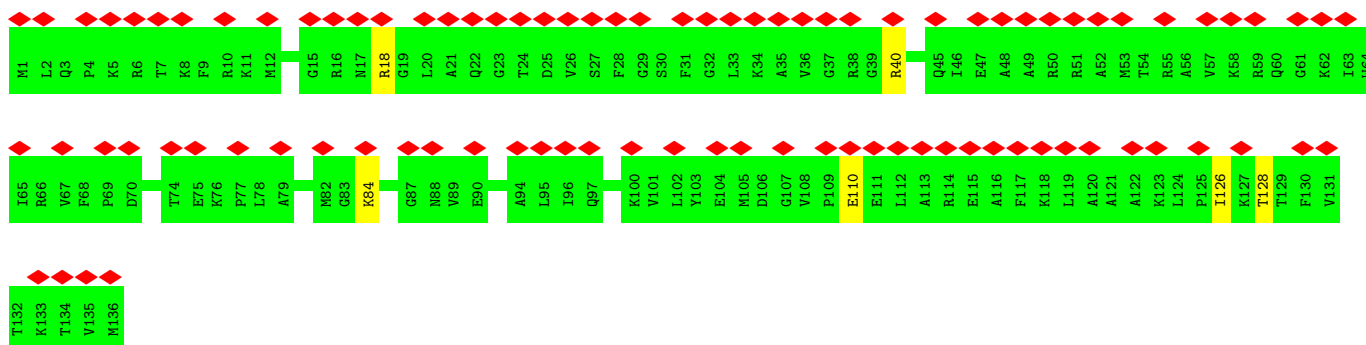
- Molecule 58: 50S ribosomal protein L15

Chain u:



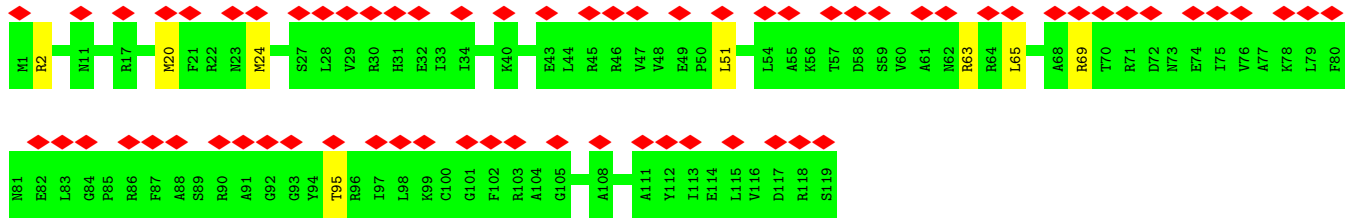
- Molecule 59: 50S ribosomal protein L16

Chain v:

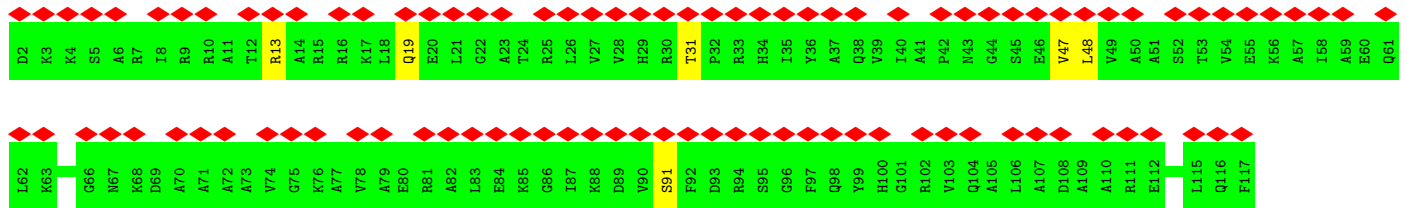
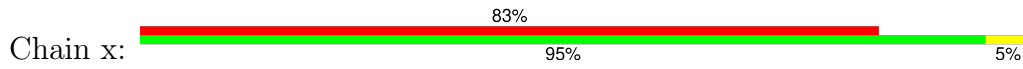


- Molecule 60: 50S ribosomal protein L17

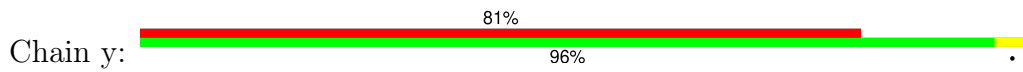
Chain w:



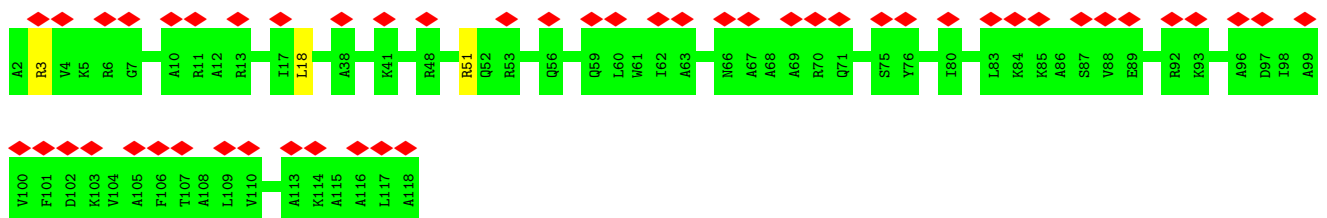
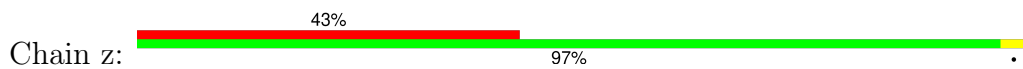
- Molecule 61: 50S ribosomal protein L18



- Molecule 62: 50S ribosomal protein L19



- Molecule 63: 50S ribosomal protein L20



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	27650	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	45	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.067	Depositor
Minimum map value	-0.032	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.017	Depositor
Map size (Å)	532.48, 532.48, 532.48	wwPDB
Map dimensions	512, 512, 512	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.04, 1.04, 1.04	Depositor

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0	0.38	0/829	0.67	0/1107
2	1	0.49	0/864	0.82	0/1156
3	2	0.41	0/752	0.71	0/1005
4	3	0.35	0/796	0.66	2/1062 (0.2%)
5	4	0.40	0/766	0.68	0/1025
6	5	1.13	6/528 (1.1%)	0.97	1/810 (0.1%)
7	6	1.11	4/603 (0.7%)	0.97	0/926
8	7	0.57	2/747 (0.3%)	0.88	3/1160 (0.3%)
9	9	0.79	2/1131 (0.2%)	0.64	1/1524 (0.1%)
10	A	0.38	0/1810	0.75	1/2821 (0.0%)
10	B	0.46	1/1810 (0.1%)	0.86	7/2821 (0.2%)
11	AA	0.58	2/10591 (0.0%)	0.75	15/14289 (0.1%)
12	AC	0.48	0/1808	0.62	1/2450 (0.0%)
12	AD	0.39	0/1789	0.57	0/2425
13	AE	0.52	4/10545 (0.0%)	0.66	5/14236 (0.0%)
14	C	0.48	0/553	0.83	0/743
15	D	0.34	10/36610 (0.0%)	0.74	30/57091 (0.1%)
16	E	0.57	0/675	0.85	0/895
17	F	0.56	0/597	0.87	0/792
18	G	0.49	0/1791	0.71	0/2413
19	H	0.54	1/1746 (0.1%)	1.03	13/2382 (0.5%)
20	I	0.43	0/1663	0.71	0/2241
21	J	0.47	0/1665	0.73	0/2227
22	K	0.45	0/1165	0.75	0/1568
23	L	0.43	0/867	0.75	1/1171 (0.1%)
24	M	0.50	0/1195	0.81	0/1602
25	N	0.41	0/989	0.69	0/1326
26	O	0.43	0/1034	0.75	0/1375
27	P	0.43	0/800	0.75	0/1082
28	Q	0.40	0/893	0.70	0/1205
29	R	0.35	0/952	0.74	0/1274
30	S	0.49	0/817	0.79	0/1088

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
31	T	0.53	0/722	0.86	0/964
32	U	0.44	0/659	0.78	0/884
33	V	0.34	0/657	0.62	0/881
34	W	0.38	0/680	0.62	0/915
35	X	0.49	0/909	0.86	0/1215
36	Y	0.67	0/1046	0.59	0/1410
37	Z	0.69	0/227	0.57	0/304
38	a	0.38	3/69247 (0.0%)	0.72	17/107985 (0.0%)
39	b	0.39	0/589	0.71	0/779
40	c	0.48	0/635	0.82	2/848 (0.2%)
41	d	0.29	0/2872	0.70	0/4478
42	e	0.53	0/502	0.83	0/667
43	f	0.45	0/452	0.78	0/605
44	g	0.43	0/531	0.68	0/709
45	h	0.39	0/2121	0.78	0/2852
46	i	0.40	0/450	0.79	0/599
47	j	0.44	0/1586	0.69	0/2134
48	k	0.35	0/433	0.64	0/576
49	l	0.46	0/1571	0.77	0/2113
50	m	0.53	0/380	0.99	0/498
51	n	0.49	0/1434	0.88	3/1926 (0.2%)
52	o	0.45	0/513	0.83	0/676
53	p	0.39	0/1333	0.67	0/1805
54	q	0.37	0/303	0.77	0/397
55	r	0.43	0/1122	0.69	0/1515
56	s	0.50	0/1152	0.75	0/1551
57	t	0.41	0/955	0.78	0/1279
58	u	0.40	0/1062	0.76	0/1413
59	v	0.47	0/1093	0.82	0/1460
60	w	0.52	0/964	0.87	0/1289
61	x	0.46	0/902	0.81	0/1209
62	y	0.41	0/929	0.73	1/1242 (0.1%)
63	z	0.60	0/960	0.91	0/1278
All	All	0.43	35/188372 (0.0%)	0.74	103/277748 (0.0%)

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
10	A	0	2

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Mol	Chain	#Chirality outliers	#Planarity outliers
10	B	0	2
11	AA	0	10
13	AE	0	5
19	H	0	3
35	X	0	1
All	All	0	23

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	9	130	PRO	N-CA	13.73	1.70	1.47
15	D	1516	G	O3'-P	-13.42	1.45	1.61
15	D	1339	A	O3'-P	10.59	1.73	1.61
11	AA	374	GLU	C-N	10.44	1.54	1.34
13	AE	88	CYS	CB-SG	-10.14	1.65	1.82
6	5	109	DT	O3'-P	8.71	1.71	1.61
15	D	145	G	O3'-P	8.43	1.71	1.61
15	D	196	A	O3'-P	8.31	1.71	1.61
7	6	10	DG	C1'-N9	-8.27	1.35	1.47
11	AA	850	ILE	N-CA	-8.19	1.29	1.46
15	D	1275	A	O3'-P	7.76	1.70	1.61
19	H	169	SER	N-CA	7.50	1.61	1.46
38	a	2434	A	O3'-P	7.47	1.70	1.61
15	D	1515	G	O3'-P	-7.28	1.52	1.61
6	5	121	DG	C1'-N9	-7.27	1.37	1.47
8	7	19	G	C1'-N9	-7.20	1.36	1.46
15	D	1395	C	O3'-P	7.17	1.69	1.61
8	7	-10	U	C1'-N1	6.97	1.59	1.48
15	D	1490	U	O3'-P	6.82	1.69	1.61
6	5	112	DG	C1'-N9	-6.74	1.37	1.47
15	D	1492	A	O3'-P	6.59	1.69	1.61
38	a	1905	C	O3'-P	6.59	1.69	1.61
38	a	2167	U	O3'-P	6.56	1.69	1.61
6	5	100	DA	C1'-N9	-6.45	1.38	1.47
7	6	21	DA	C1'-N9	-6.39	1.38	1.47
13	AE	93	THR	CA-C	6.23	1.69	1.52
9	9	129	LEU	C-N	6.11	1.45	1.34
6	5	116	DG	C1'-N9	-6.07	1.38	1.47
6	5	115	DA	C1'-N9	-6.00	1.38	1.47
13	AE	70	CYS	CA-CB	-5.79	1.41	1.53
7	6	28	DA	C1'-N9	-5.74	1.39	1.47
10	B	36	U	O3'-P	5.73	1.68	1.61

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	D	1397	C	O3'-P	5.72	1.68	1.61
7	6	24	DT	C1'-N1	5.36	1.56	1.49
13	AE	801	VAL	CB-CG2	-5.01	1.42	1.52

All (103) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	D	1516	G	P-O3'-C3'	-18.99	96.91	119.70
15	D	1516	G	O3'-P-O5'	13.81	130.24	104.00
11	AA	1250	SER	C-N-CA	11.14	149.56	121.70
38	a	2252	G	N9-C1'-C2'	-10.93	99.80	114.00
15	D	1401	G	N9-C1'-C2'	-10.68	100.12	114.00
51	n	73	SER	N-CA-CB	-10.60	94.61	110.50
15	D	1499	A	N9-C1'-C2'	-10.29	100.63	114.00
15	D	528	C	N1-C1'-C2'	-10.22	100.71	114.00
19	H	169	SER	N-CA-C	9.97	137.93	111.00
15	D	1339	A	P-O3'-C3'	9.86	131.54	119.70
10	B	29	G	N9-C1'-C2'	-9.75	101.28	112.00
10	B	28	C	P-O3'-C3'	9.64	131.26	119.70
13	AE	271	ARG	NE-CZ-NH2	-9.38	115.61	120.30
11	AA	375	PRO	CA-N-CD	-9.32	98.45	111.50
15	D	196	A	P-O3'-C3'	9.30	130.85	119.70
15	D	526	C	N1-C1'-C2'	-8.86	102.26	112.00
19	H	88	LYS	C-N-CA	8.73	143.53	121.70
38	a	2167	U	P-O3'-C3'	8.62	130.04	119.70
15	D	1208	C	N1-C1'-C2'	-8.56	102.58	112.00
15	D	1206	G	N9-C1'-C2'	-8.36	102.80	112.00
9	9	130	PRO	CA-N-CD	-8.25	99.95	111.50
38	a	2434	A	P-O3'-C3'	8.25	129.59	119.70
11	AA	995	ASP	O-C-N	-8.24	109.52	122.70
11	AA	376	PRO	N-CA-CB	-8.01	93.69	103.30
15	D	1406	U	N1-C1'-C2'	-7.77	103.46	112.00
15	D	1275	A	P-O3'-C3'	7.67	128.90	119.70
38	a	1905	C	P-O3'-C3'	7.65	128.88	119.70
15	D	1492	A	P-O3'-C3'	7.55	128.76	119.70
15	D	1490	U	P-O3'-C3'	7.55	128.76	119.70
19	H	305	HIS	N-CA-C	7.44	131.09	111.00
10	B	29	G	C3'-C2'-O2'	7.37	134.67	113.30
8	7	-11	A	OP2-P-O3'	7.22	121.09	105.20
15	D	1206	G	C4'-C3'-O3'	7.14	127.27	113.00
15	D	1493	A	C2'-C3'-O3'	7.13	125.18	109.50
10	B	35	A	P-O3'-C3'	7.10	128.22	119.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
38	a	2245	U	N1-C1'-C2'	-7.05	104.25	112.00
15	D	145	G	P-O3'-C3'	7.04	128.15	119.70
15	D	1516	G	OP1-P-O3'	-6.98	89.85	105.20
15	D	1395	C	P-O3'-C3'	6.94	128.03	119.70
11	AA	855	PRO	N-CA-CB	-6.88	95.04	102.60
8	7	-11	A	O3'-P-O5'	-6.79	91.11	104.00
51	n	73	SER	CB-CA-C	6.73	122.88	110.10
11	AA	995	ASP	CA-C-N	6.69	131.91	117.20
15	D	1515	G	O3'-P-O5'	-6.67	91.34	104.00
15	D	1401	G	C4'-C3'-O3'	6.64	126.27	113.00
38	a	2250	G	C4'-C3'-O3'	-6.61	95.53	109.40
38	a	2243	U	N1-C1'-C2'	-6.60	104.74	112.00
38	a	1379	U	C2'-C3'-O3'	6.54	124.16	113.70
15	D	1515	G	P-O3'-C3'	6.50	127.50	119.70
19	H	339	ARG	C-N-CA	6.46	137.84	121.70
11	AA	935	THR	CA-CB-OG1	-6.45	95.46	109.00
15	D	515	G	N9-C1'-C2'	-6.41	104.95	112.00
15	D	1497	G	N9-C1'-C2'	-6.40	104.96	112.00
15	D	1408	A	N9-C1'-C2'	-6.39	104.97	112.00
6	5	109	DT	P-O3'-C3'	6.39	127.36	119.70
10	B	34	C	P-O3'-C3'	6.36	127.34	119.70
12	AC	117	HIS	CB-CA-C	-6.21	97.97	110.40
11	AA	849	GLU	C-N-CA	6.09	136.93	121.70
11	AA	1004	ASP	CB-CA-C	6.00	122.40	110.40
19	H	140	PRO	N-CA-CB	5.97	110.47	103.30
11	AA	943	LYS	CA-C-O	-5.94	107.64	120.10
10	B	29	G	P-O3'-C3'	5.93	126.82	119.70
11	AA	727	VAL	N-CA-C	-5.91	95.03	111.00
19	H	330	VAL	N-CA-C	5.90	126.93	111.00
19	H	336	ASP	CB-CA-C	-5.90	98.61	110.40
11	AA	943	LYS	CA-C-N	5.87	130.11	117.20
38	a	754	U	N1-C1'-C2'	5.86	121.62	114.00
19	H	168	VAL	C-N-CA	5.82	136.25	121.70
19	H	132	PRO	N-CA-CB	5.81	110.28	103.30
13	AE	903	LEU	C-N-CA	5.73	136.02	121.70
15	D	517	G	C5'-C4'-C3'	5.71	125.14	116.00
19	H	344	LEU	CA-CB-CG	5.66	128.32	115.30
38	a	2244	U	C1'-C2'-O2'	-5.63	93.71	110.60
51	n	127	ASN	CB-CA-C	5.63	121.66	110.40
13	AE	363	LEU	CA-CB-CG	5.59	128.17	115.30
23	L	54	LEU	CA-CB-CG	5.57	128.11	115.30
38	a	783	A	C4'-C3'-O3'	5.47	123.94	113.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	AA	1233	LEU	CA-CB-CG	5.45	127.83	115.30
40	c	28	ARG	NE-CZ-NH2	-5.44	117.58	120.30
62	y	109	ARG	NE-CZ-NH2	5.38	122.99	120.30
15	D	1397	C	P-O3'-C3'	5.35	126.12	119.70
4	3	22	ARG	NE-CZ-NH1	5.33	122.97	120.30
15	D	1340	A	C5'-C4'-C3'	5.31	124.50	116.00
11	AA	728	ASP	N-CA-C	5.30	125.31	111.00
38	a	742	A	C8-N9-C1'	-5.26	118.24	127.70
38	a	404	A	C2'-C3'-O3'	5.21	122.04	113.70
15	D	1340	A	C5'-C4'-O4'	5.19	115.33	109.10
38	a	2244	U	C4'-C3'-O3'	5.16	123.33	113.00
19	H	169	SER	N-CA-CB	-5.16	102.76	110.50
8	7	-8	U	C2'-C3'-O3'	5.14	121.93	113.70
11	AA	817	LEU	CB-CG-CD2	-5.14	102.26	111.00
38	a	742	A	C4-N9-C1'	5.11	135.49	126.30
4	3	22	ARG	NE-CZ-NH2	-5.10	117.75	120.30
38	a	2252	G	C4'-C3'-O3'	5.10	123.19	113.00
10	B	48	C	N1-C1'-C2'	5.07	120.59	114.00
40	c	28	ARG	NE-CZ-NH1	5.06	122.83	120.30
15	D	197	A	C2'-C3'-O3'	5.06	121.80	113.70
10	A	48	C	N1-C1'-C2'	5.05	120.57	114.00
13	AE	73	GLY	N-CA-C	5.02	125.65	113.10
19	H	153	GLU	N-CA-C	-5.02	97.45	111.00
13	AE	807	LEU	CB-CG-CD2	-5.02	102.47	111.00
38	a	375	G	C2'-C3'-O3'	5.01	121.72	113.70
19	H	332	VAL	N-CA-C	5.01	124.53	111.00

There are no chirality outliers.

All (23) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
10	A	19	G	Sidechain
10	A	7	G	Sidechain
11	AA	1134	GLN	Peptide
11	AA	1157	GLN	Peptide
11	AA	1158	LYS	Peptide
11	AA	205	PRO	Peptide
11	AA	594	VAL	Peptide
11	AA	595	THR	Peptide
11	AA	596	ASP	Mainchain
11	AA	696	ASP	Peptide
11	AA	746	ALA	Peptide

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Mol	Chain	Res	Type	Group
11	AA	853	ASP	Mainchain
13	AE	1184	ASP	Peptide
13	AE	1326	GLN	Peptide
13	AE	313	GLY	Peptide
13	AE	416	ILE	Peptide
13	AE	804	ALA	Peptide
10	B	19	G	Sidechain
10	B	7	G	Sidechain
19	H	274	TYR	Peptide
19	H	81	GLU	Peptide
19	H	82	THR	Peptide
35	X	100	GLN	Mainchain

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	
1	0	101/103 (98%)	97 (96%)	3 (3%)	1 (1%)	13	48
2	1	108/110 (98%)	104 (96%)	4 (4%)	0	100	100
3	2	92/100 (92%)	90 (98%)	2 (2%)	0	100	100
4	3	101/104 (97%)	96 (95%)	4 (4%)	1 (1%)	13	48
5	4	92/94 (98%)	91 (99%)	1 (1%)	0	100	100
9	9	146/165 (88%)	95 (65%)	37 (25%)	14 (10%)	0	9
11	AA	1318/1342 (98%)	1150 (87%)	136 (10%)	32 (2%)	5	30
12	AC	228/329 (69%)	215 (94%)	11 (5%)	2 (1%)	14	50
12	AD	226/329 (69%)	212 (94%)	14 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
13	AE	1329/1407 (94%)	1200 (90%)	120 (9%)	9 (1%)	19	56
14	C	64/75 (85%)	63 (98%)	1 (2%)	0	100	100
16	E	84/87 (97%)	83 (99%)	1 (1%)	0	100	100
17	F	68/71 (96%)	68 (100%)	0	0	100	100
18	G	223/241 (92%)	210 (94%)	13 (6%)	0	100	100
19	H	255/557 (46%)	188 (74%)	55 (22%)	12 (5%)	2	19
20	I	206/233 (88%)	197 (96%)	8 (4%)	1 (0%)	25	62
21	J	203/205 (99%)	198 (98%)	5 (2%)	0	100	100
22	K	154/167 (92%)	146 (95%)	7 (4%)	1 (1%)	22	59
23	L	102/135 (76%)	97 (95%)	4 (4%)	1 (1%)	13	48
24	M	149/151 (99%)	144 (97%)	4 (3%)	1 (1%)	19	56
25	N	127/129 (98%)	121 (95%)	5 (4%)	1 (1%)	16	53
26	O	125/127 (98%)	115 (92%)	9 (7%)	1 (1%)	16	53
27	P	97/99 (98%)	88 (91%)	8 (8%)	1 (1%)	13	48
28	Q	115/117 (98%)	104 (90%)	9 (8%)	2 (2%)	7	37
29	R	117/123 (95%)	116 (99%)	1 (1%)	0	100	100
30	S	98/101 (97%)	96 (98%)	2 (2%)	0	100	100
31	T	86/89 (97%)	82 (95%)	4 (5%)	0	100	100
32	U	80/82 (98%)	75 (94%)	4 (5%)	1 (1%)	10	42
33	V	78/84 (93%)	74 (95%)	4 (5%)	0	100	100
34	W	81/83 (98%)	78 (96%)	3 (4%)	0	100	100
35	X	114/116 (98%)	107 (94%)	5 (4%)	2 (2%)	7	36
36	Y	139/141 (99%)	102 (73%)	25 (18%)	12 (9%)	0	10
37	Z	28/121 (23%)	19 (68%)	7 (25%)	2 (7%)	1	13
39	b	74/76 (97%)	69 (93%)	5 (7%)	0	100	100
40	c	75/78 (96%)	72 (96%)	3 (4%)	0	100	100
42	e	60/62 (97%)	57 (95%)	3 (5%)	0	100	100
43	f	56/58 (97%)	53 (95%)	3 (5%)	0	100	100
44	g	64/66 (97%)	63 (98%)	1 (2%)	0	100	100
45	h	269/271 (99%)	259 (96%)	9 (3%)	1 (0%)	30	67
46	i	54/56 (96%)	51 (94%)	3 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
47	j	207/209 (99%)	198 (96%)	9 (4%)	0	100	100
48	k	50/55 (91%)	50 (100%)	0	0	100	100
49	l	199/201 (99%)	190 (96%)	8 (4%)	1 (0%)	25	62
50	m	44/46 (96%)	43 (98%)	1 (2%)	0	100	100
51	n	175/177 (99%)	162 (93%)	11 (6%)	2 (1%)	12	46
52	o	62/64 (97%)	59 (95%)	3 (5%)	0	100	100
53	p	173/175 (99%)	161 (93%)	12 (7%)	0	100	100
54	q	36/38 (95%)	35 (97%)	1 (3%)	0	100	100
55	r	147/149 (99%)	136 (92%)	11 (8%)	0	100	100
56	s	140/142 (99%)	135 (96%)	5 (4%)	0	100	100
57	t	121/123 (98%)	111 (92%)	10 (8%)	0	100	100
58	u	142/144 (99%)	135 (95%)	7 (5%)	0	100	100
59	v	134/136 (98%)	129 (96%)	5 (4%)	0	100	100
60	w	117/119 (98%)	107 (92%)	10 (8%)	0	100	100
61	x	114/116 (98%)	108 (95%)	6 (5%)	0	100	100
62	y	112/114 (98%)	105 (94%)	7 (6%)	0	100	100
63	z	115/117 (98%)	110 (96%)	4 (4%)	1 (1%)	14	50
All	All	9274/10209 (91%)	8519 (92%)	653 (7%)	102 (1%)	15	46

All (102) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
9	9	88	HIS
11	AA	596	ASP
11	AA	853	ASP
11	AA	859	GLU
11	AA	862	LEU
11	AA	873	ILE
11	AA	937	ASP
11	AA	993	PRO
19	H	139	ARG
19	H	153	GLU
19	H	169	SER
19	H	306	VAL
19	H	340	ARG
26	O	56	ASP

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Mol	Chain	Res	Type
35	X	103	LYS
36	Y	48	ILE
9	9	33	VAL
9	9	119	PRO
11	AA	375	PRO
11	AA	856	ASN
11	AA	870	ILE
11	AA	940	GLU
11	AA	985	GLU
11	AA	1003	THR
11	AA	1158	LYS
13	AE	175	GLU
19	H	108	VAL
19	H	309	MET
19	H	333	LEU
36	Y	93	ASN
45	h	158	ALA
49	l	142	ALA
63	z	3	ARG
9	9	48	ALA
9	9	91	ALA
9	9	118	ILE
9	9	130	PRO
11	AA	376	PRO
11	AA	723	VAL
11	AA	728	ASP
11	AA	935	THR
11	AA	980	VAL
11	AA	1005	GLU
11	AA	1045	GLY
12	AC	164	ASP
12	AC	165	GLU
13	AE	51	PRO
13	AE	805	GLN
19	H	76	GLU
19	H	142	ARG
24	M	130	ASN
27	P	58	ASN
28	Q	119	ASN
36	Y	20	SER
36	Y	64	ARG
36	Y	106	GLN

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Mol	Chain	Res	Type
9	9	69	PHE
9	9	73	LYS
9	9	108	VAL
9	9	129	LEU
9	9	133	GLU
11	AA	850	ILE
11	AA	943	LYS
11	AA	995	ASP
13	AE	174	ASP
13	AE	193	ASP
19	H	82	THR
20	I	80	LYS
35	X	105	ASN
36	Y	83	ALA
37	Z	21	GLU
51	n	40	VAL
9	9	28	ALA
11	AA	917	SER
11	AA	991	LYS
11	AA	997	TRP
11	AA	1044	PRO
13	AE	91	GLU
19	H	70	VAL
36	Y	22	PRO
36	Y	71	LYS
36	Y	89	SER
37	Z	7	ILE
4	3	39	ILE
13	AE	49	PHE
13	AE	73	GLY
13	AE	904	ALA
36	Y	62	ALA
23	L	96	VAL
36	Y	23	VAL
36	Y	100	ILE
1	0	44	GLY
11	AA	697	LYS
11	AA	1159	VAL
11	AA	1317	PRO
22	K	44	GLY
28	Q	74	VAL
32	U	64	GLY

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Mol	Chain	Res	Type
9	9	54	VAL
51	n	62	GLY
11	AA	933	VAL
25	N	75	ILE

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	
1	0	84/84 (100%)	78 (93%)	6 (7%)	12	34
2	1	93/93 (100%)	84 (90%)	9 (10%)	6	23
3	2	81/84 (96%)	76 (94%)	5 (6%)	15	38
4	3	84/85 (99%)	78 (93%)	6 (7%)	12	34
5	4	78/78 (100%)	74 (95%)	4 (5%)	20	43
9	9	112/123 (91%)	65 (58%)	47 (42%)	0	0
11	AA	1140/1157 (98%)	1039 (91%)	101 (9%)	8	27
12	AC	198/286 (69%)	182 (92%)	16 (8%)	9	31
12	AD	196/286 (68%)	194 (99%)	2 (1%)	73	81
13	AE	1120/1168 (96%)	1051 (94%)	69 (6%)	15	38
14	C	57/65 (88%)	55 (96%)	2 (4%)	31	53
16	E	65/66 (98%)	60 (92%)	5 (8%)	10	32
17	F	60/61 (98%)	57 (95%)	3 (5%)	20	44
18	G	187/199 (94%)	178 (95%)	9 (5%)	21	45
19	H	137/461 (30%)	128 (93%)	9 (7%)	14	36
20	I	171/190 (90%)	165 (96%)	6 (4%)	31	53
21	J	172/172 (100%)	165 (96%)	7 (4%)	26	49
22	K	119/126 (94%)	112 (94%)	7 (6%)	16	40
23	L	91/116 (78%)	85 (93%)	6 (7%)	14	36
24	M	124/124 (100%)	116 (94%)	8 (6%)	14	37

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
25	N	104/104 (100%)	102 (98%)	2 (2%)	52	69
26	O	105/105 (100%)	100 (95%)	5 (5%)	21	45
27	P	86/86 (100%)	77 (90%)	9 (10%)	5	21
28	Q	90/90 (100%)	87 (97%)	3 (3%)	33	55
29	R	101/103 (98%)	94 (93%)	7 (7%)	13	35
30	S	83/84 (99%)	79 (95%)	4 (5%)	21	45
31	T	76/77 (99%)	64 (84%)	12 (16%)	2	13
32	U	65/65 (100%)	61 (94%)	4 (6%)	15	38
33	V	74/78 (95%)	72 (97%)	2 (3%)	40	61
34	W	72/72 (100%)	68 (94%)	4 (6%)	17	41
35	X	94/94 (100%)	85 (90%)	9 (10%)	7	24
36	Y	109/109 (100%)	72 (66%)	37 (34%)	0	1
37	Z	26/85 (31%)	12 (46%)	14 (54%)	0	0
39	b	58/58 (100%)	57 (98%)	1 (2%)	56	72
40	c	67/68 (98%)	64 (96%)	3 (4%)	23	47
42	e	54/54 (100%)	53 (98%)	1 (2%)	52	69
43	f	48/48 (100%)	46 (96%)	2 (4%)	25	49
44	g	59/59 (100%)	53 (90%)	6 (10%)	6	22
45	h	216/216 (100%)	199 (92%)	17 (8%)	10	32
46	i	47/47 (100%)	41 (87%)	6 (13%)	3	17
47	j	164/164 (100%)	157 (96%)	7 (4%)	25	48
48	k	47/49 (96%)	44 (94%)	3 (6%)	14	37
49	l	165/165 (100%)	151 (92%)	14 (8%)	8	30
50	m	38/38 (100%)	35 (92%)	3 (8%)	10	32
51	n	148/148 (100%)	134 (90%)	14 (10%)	7	24
52	o	51/51 (100%)	46 (90%)	5 (10%)	6	23
53	p	136/136 (100%)	132 (97%)	4 (3%)	37	58
54	q	34/34 (100%)	32 (94%)	2 (6%)	16	40
55	r	114/114 (100%)	104 (91%)	10 (9%)	8	28
56	s	116/116 (100%)	110 (95%)	6 (5%)	19	43
57	t	104/104 (100%)	98 (94%)	6 (6%)	17	40

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
58	u	103/103 (100%)	97 (94%)	6 (6%)	17	40
59	v	109/109 (100%)	103 (94%)	6 (6%)	18	42
60	w	99/99 (100%)	91 (92%)	8 (8%)	9	31
61	x	86/86 (100%)	80 (93%)	6 (7%)	12	35
62	y	99/99 (100%)	95 (96%)	4 (4%)	27	50
63	z	89/89 (100%)	87 (98%)	2 (2%)	47	65
All	All	7705/8430 (91%)	7124 (92%)	581 (8%)	14	33

All (581) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	0	10	LYS
1	0	13	ARG
1	0	48	LYS
1	0	51	VAL
1	0	68	ARG
1	0	86	GLN
2	1	7	HIS
2	1	19	LEU
2	1	30	SER
2	1	41	LYS
2	1	69	LEU
2	1	97	LEU
2	1	107	VAL
2	1	109	ASP
2	1	110	ARG
3	2	1	MET
3	2	24	MET
3	2	37	ASP
3	2	59	ASN
3	2	93	LEU
4	3	52	LEU
4	3	68	SER
4	3	72	ILE
4	3	89	ASP
4	3	99	ASN
4	3	101	GLU
5	4	40	ILE
5	4	41	GLU
5	4	69	GLU

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Mol	Chain	Res	Type
5	4	71	LYS
9	9	1	MET
9	9	3	LEU
9	9	4	ASN
9	9	5	LEU
9	9	6	GLN
9	9	7	ASP
9	9	11	ILE
9	9	14	GLU
9	9	23	LEU
9	9	24	SER
9	9	27	VAL
9	9	30	SER
9	9	31	ARG
9	9	34	THR
9	9	36	ASP
9	9	37	LYS
9	9	39	THR
9	9	42	ARG
9	9	43	LYS
9	9	51	TYR
9	9	52	MET
9	9	56	ARG
9	9	57	ASN
9	9	61	ARG
9	9	62	ARG
9	9	69	PHE
9	9	70	GLU
9	9	71	CYS
9	9	72	LEU
9	9	81	LEU
9	9	86	MET
9	9	94	ARG
9	9	96	PHE
9	9	98	GLU
9	9	106	PHE
9	9	107	GLU
9	9	109	LYS
9	9	113	PHE
9	9	117	LEU
9	9	122	GLN
9	9	123	ILE

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Mol	Chain	Res	Type
9	9	125	ARG
9	9	133	GLU
9	9	134	GLU
9	9	138	ARG
9	9	142	THR
9	9	143	MET
11	AA	376	PRO
11	AA	723	VAL
11	AA	728	ASP
11	AA	731	ARG
11	AA	752	ASN
11	AA	817	LEU
11	AA	840	SER
11	AA	844	LYS
11	AA	845	LEU
11	AA	851	THR
11	AA	854	ILE
11	AA	855	PRO
11	AA	857	VAL
11	AA	862	LEU
11	AA	864	LYS
11	AA	865	LEU
11	AA	866	ASP
11	AA	867	GLU
11	AA	868	SER
11	AA	871	VAL
11	AA	873	ILE
11	AA	876	GLU
11	AA	884	VAL
11	AA	886	LYS
11	AA	890	LYS
11	AA	912	ASP
11	AA	913	VAL
11	AA	914	LYS
11	AA	918	LEU
11	AA	933	VAL
11	AA	936	ARG
11	AA	939	VAL
11	AA	941	LYS
11	AA	943	LYS
11	AA	944	ARG
11	AA	949	GLU

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Mol	Chain	Res	Type
11	AA	950	GLU
11	AA	951	MET
11	AA	952	GLN
11	AA	953	LEU
11	AA	954	LYS
11	AA	955	GLN
11	AA	957	LYS
11	AA	958	LYS
11	AA	959	ASP
11	AA	960	LEU
11	AA	962	GLU
11	AA	963	GLU
11	AA	964	LEU
11	AA	965	GLN
11	AA	967	LEU
11	AA	968	GLU
11	AA	971	LEU
11	AA	973	SER
11	AA	974	ARG
11	AA	979	LEU
11	AA	980	VAL
11	AA	985	GLU
11	AA	988	LYS
11	AA	989	LEU
11	AA	991	LYS
11	AA	992	LEU
11	AA	994	ARG
11	AA	995	ASP
11	AA	997	TRP
11	AA	998	LEU
11	AA	999	GLU
11	AA	1002	LEU
11	AA	1005	GLU
11	AA	1006	GLU
11	AA	1007	LYS
11	AA	1008	GLN
11	AA	1009	ASN
11	AA	1010	GLN
11	AA	1013	GLN
11	AA	1019	ASP
11	AA	1020	GLU
11	AA	1022	LYS

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Mol	Chain	Res	Type
11	AA	1023	HIS
11	AA	1024	GLU
11	AA	1025	PHE
11	AA	1026	GLU
11	AA	1027	LYS
11	AA	1029	LEU
11	AA	1032	LYS
11	AA	1034	ARG
11	AA	1035	LYS
11	AA	1038	GLN
11	AA	1041	ASP
11	AA	1042	LEU
11	AA	1046	VAL
11	AA	1047	LEU
11	AA	1048	LYS
11	AA	1151	LEU
11	AA	1159	VAL
11	AA	1250	SER
11	AA	1252	SER
11	AA	1253	LEU
11	AA	1254	VAL
11	AA	1256	GLN
11	AA	1259	LEU
12	AC	12	ARG
12	AC	62	ASP
12	AC	65	LEU
12	AC	72	GLU
12	AC	91	ARG
12	AC	134	THR
12	AC	158	ARG
12	AC	159	ILE
12	AC	160	HIS
12	AC	162	GLU
12	AC	163	GLU
12	AC	165	GLU
12	AC	166	ARG
12	AC	168	ILE
12	AC	170	ARG
12	AC	171	LEU
12	AD	12	ARG
12	AD	208	ASN
13	AE	40	LYS

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Mol	Chain	Res	Type
13	AE	42	GLU
13	AE	44	ILE
13	AE	46	TYR
13	AE	47	ARG
13	AE	49	PHE
13	AE	50	LYS
13	AE	52	GLU
13	AE	53	ARG
13	AE	54	ASP
13	AE	60	ARG
13	AE	67	ASP
13	AE	70	CYS
13	AE	72	CYS
13	AE	74	LYS
13	AE	76	LYS
13	AE	77	ARG
13	AE	78	LEU
13	AE	81	ARG
13	AE	87	LYS
13	AE	88	CYS
13	AE	91	GLU
13	AE	94	GLN
13	AE	95	THR
13	AE	99	ARG
13	AE	100	GLU
13	AE	117	LEU
13	AE	119	SER
13	AE	123	ARG
13	AE	132	LEU
13	AE	135	ILE
13	AE	142	GLU
13	AE	144	TYR
13	AE	145	VAL
13	AE	147	ILE
13	AE	152	THR
13	AE	154	LEU
13	AE	157	GLN
13	AE	159	ILE
13	AE	175	GLU
13	AE	180	MET
13	AE	190	LYS
13	AE	193	ASP

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Mol	Chain	Res	Type
13	AE	196	GLN
13	AE	210	SER
13	AE	215	LYS
13	AE	216	LYS
13	AE	222	LYS
13	AE	223	LEU
13	AE	227	PHE
13	AE	232	ASN
13	AE	233	LYS
13	AE	237	MET
13	AE	238	ILE
13	AE	239	LEU
13	AE	240	THR
13	AE	244	VAL
13	AE	271	ARG
13	AE	385	LEU
13	AE	386	GLU
13	AE	390	LEU
13	AE	393	THR
13	AE	394	ILE
13	AE	395	LYS
13	AE	514	THR
13	AE	709	ARG
13	AE	836	ARG
13	AE	1172	LYS
13	AE	1373	ARG
14	C	33	ILE
14	C	74	HIS
16	E	6	SER
16	E	10	ARG
16	E	48	GLN
16	E	54	MET
16	E	64	LYS
17	F	34	ARG
17	F	62	ARG
17	F	67	ARG
18	G	8	ASP
18	G	23	TRP
18	G	45	LYS
18	G	105	LYS
18	G	108	ARG
18	G	128	LYS

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Mol	Chain	Res	Type
18	G	129	LEU
18	G	132	LYS
18	G	208	ARG
19	H	9	PHE
19	H	54	LYS
19	H	273	ARG
19	H	305	HIS
19	H	336	ASP
19	H	337	GLU
19	H	338	GLU
19	H	339	ARG
19	H	340	ARG
20	I	14	ILE
20	I	75	ILE
20	I	89	LYS
20	I	164	ARG
20	I	185	ASN
20	I	200	VAL
21	J	47	ARG
21	J	48	LEU
21	J	95	GLU
21	J	104	ARG
21	J	116	GLN
21	J	138	SER
21	J	143	VAL
22	K	10	GLU
22	K	15	LEU
22	K	60	ILE
22	K	114	VAL
22	K	115	LEU
22	K	138	ARG
22	K	162	GLU
23	L	16	GLU
23	L	24	ARG
23	L	38	ARG
23	L	54	LEU
23	L	79	ARG
23	L	86	ARG
24	M	7	ILE
24	M	17	LYS
24	M	21	GLU
24	M	23	LEU

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Mol	Chain	Res	Type
24	M	79	ARG
24	M	109	ARG
24	M	130	ASN
24	M	146	GLU
25	N	96	MET
25	N	121	LEU
26	O	12	ARG
26	O	27	LYS
26	O	60	LYS
26	O	63	LEU
26	O	118	LEU
27	P	5	ARG
27	P	17	LEU
27	P	24	GLU
27	P	25	ILE
27	P	27	GLU
27	P	37	ARG
27	P	87	LEU
27	P	89	ARG
27	P	90	LEU
28	Q	15	GLN
28	Q	56	ARG
28	Q	107	ILE
29	R	5	ASN
29	R	12	ARG
29	R	24	LEU
29	R	56	ARG
29	R	62	GLU
29	R	74	LEU
29	R	102	LEU
30	S	45	VAL
30	S	46	LEU
30	S	89	MET
30	S	92	GLU
31	T	10	LYS
31	T	17	ARG
31	T	22	THR
31	T	39	LEU
31	T	40	GLN
31	T	64	ARG
31	T	66	LEU
31	T	67	LEU

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Mol	Chain	Res	Type
31	T	70	LEU
31	T	73	LYS
31	T	84	ARG
31	T	85	LEU
32	U	1	MET
32	U	2	VAL
32	U	6	LEU
32	U	19	VAL
33	V	75	LEU
33	V	81	LYS
34	W	12	ASP
34	W	21	LYS
34	W	33	THR
34	W	79	THR
35	X	11	ASP
35	X	16	VAL
35	X	25	VAL
35	X	29	ARG
35	X	59	GLU
35	X	92	ARG
35	X	93	ARG
35	X	101	ARG
35	X	117	LYS
36	Y	9	LYS
36	Y	10	LEU
36	Y	16	MET
36	Y	23	VAL
36	Y	27	LEU
36	Y	30	GLN
36	Y	36	GLU
36	Y	44	LYS
36	Y	48	ILE
36	Y	50	LYS
36	Y	58	ILE
36	Y	60	VAL
36	Y	61	TYR
36	Y	64	ARG
36	Y	65	SER
36	Y	67	THR
36	Y	71	LYS
36	Y	78	LEU
36	Y	80	LYS

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Mol	Chain	Res	Type
36	Y	81	LYS
36	Y	91	LYS
36	Y	94	LYS
36	Y	95	ASP
36	Y	99	LYS
36	Y	100	ILE
36	Y	101	SER
36	Y	102	ARG
36	Y	104	GLN
36	Y	108	ILE
36	Y	112	LYS
36	Y	116	MET
36	Y	120	ASP
36	Y	124	MET
36	Y	125	THR
36	Y	126	ARG
36	Y	133	ARG
36	Y	135	MET
37	Z	1	SER
37	Z	2	ILE
37	Z	4	LYS
37	Z	6	GLN
37	Z	7	ILE
37	Z	8	ILE
37	Z	14	MET
37	Z	15	SER
37	Z	16	VAL
37	Z	23	ILE
37	Z	26	MET
37	Z	28	GLU
37	Z	29	LYS
37	Z	30	PHE
39	b	70	GLU
40	c	48	THR
40	c	54	LYS
40	c	71	LEU
42	e	58	ASN
43	f	3	LYS
43	f	45	ARG
44	g	3	LYS
44	g	16	CYS
44	g	43	PHE

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Mol	Chain	Res	Type
44	g	47	LYS
44	g	59	ARG
44	g	65	ASN
45	h	51	THR
45	h	52	ARG
45	h	118	SER
45	h	125	LYS
45	h	130	LEU
45	h	141	VAL
45	h	156	ARG
45	h	187	ASP
45	h	189	ARG
45	h	195	VAL
45	h	202	LEU
45	h	203	ARG
45	h	204	VAL
45	h	205	LEU
45	h	242	LYS
45	h	258	ARG
45	h	271	ARG
46	i	9	THR
46	i	12	LYS
46	i	26	THR
46	i	27	SER
46	i	29	SER
46	i	40	ARG
47	j	13	ARG
47	j	18	ASP
47	j	32	ASN
47	j	46	ARG
47	j	91	THR
47	j	103	ASP
47	j	131	ASP
48	k	5	ILE
48	k	24	THR
48	k	26	ASN
49	l	7	ASP
49	l	17	THR
49	l	22	ASP
49	l	40	ARG
49	l	48	THR
49	l	57	LYS

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Mol	Chain	Res	Type
49	l	69	ARG
49	l	77	ILE
49	l	80	SER
49	l	108	ILE
49	l	109	LEU
49	l	122	GLU
49	l	149	ILE
49	l	179	SER
50	m	22	MET
50	m	41	ARG
50	m	42	LEU
51	n	6	ASP
51	n	10	ASP
51	n	57	LEU
51	n	80	ARG
51	n	95	ARG
51	n	105	THR
51	n	115	ARG
51	n	117	LEU
51	n	122	PHE
51	n	123	ASP
51	n	133	ARG
51	n	140	GLU
51	n	152	LEU
51	n	163	ASP
52	o	8	ARG
52	o	30	ARG
52	o	31	HIS
52	o	54	ASP
52	o	55	LEU
53	p	39	ASP
53	p	95	ARG
53	p	125	CYS
53	p	171	THR
54	q	3	VAL
54	q	26	ILE
55	r	11	ASN
55	r	12	LEU
55	r	15	LEU
55	r	41	LYS
55	r	66	ASN
55	r	72	ILE

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Mol	Chain	Res	Type
55	r	87	GLU
55	r	97	ARG
55	r	101	ASP
55	r	127	GLU
56	s	1	MET
56	s	14	ASP
56	s	30	THR
56	s	40	HIS
56	s	57	LEU
56	s	142	ILE
57	t	32	TYR
57	t	49	ARG
57	t	53	LYS
57	t	80	ASP
57	t	88	ASN
57	t	104	THR
58	u	5	THR
58	u	27	LEU
58	u	48	ARG
58	u	59	ARG
58	u	76	GLU
58	u	78	ARG
59	v	18	ARG
59	v	40	ARG
59	v	84	LYS
59	v	110	GLU
59	v	126	ILE
59	v	128	THR
60	w	2	ARG
60	w	20	MET
60	w	24	MET
60	w	51	LEU
60	w	63	ARG
60	w	65	LEU
60	w	69	ARG
60	w	95	THR
61	x	13	ARG
61	x	19	GLN
61	x	31	THR
61	x	47	VAL
61	x	48	LEU
61	x	91	SER

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Mol	Chain	Res	Type
62	y	10	GLN
62	y	27	GLU
62	y	85	SER
62	y	114	LEU
63	z	18	LEU
63	z	51	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
9	9	103	ASN
11	AA	1236	ASN
18	G	18	HIS
22	K	70	ASN
35	X	105	ASN
58	u	4	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
10	A	75/76 (98%)	29 (38%)	6 (8%)
10	B	75/76 (98%)	35 (46%)	6 (8%)
15	D	1515/1542 (98%)	288 (19%)	35 (2%)
38	a	2859/2904 (98%)	532 (18%)	0
41	d	119/120 (99%)	17 (14%)	0
8	7	31/32 (96%)	21 (67%)	3 (9%)
All	All	4674/4750 (98%)	922 (19%)	50 (1%)

All (922) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
8	7	-9	G
8	7	-8	U
8	7	-7	U
8	7	-5	U
8	7	-4	U
8	7	-3	U
8	7	-2	U
8	7	-1	U
8	7	0	U

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Mol	Chain	Res	Type
8	7	1	U
8	7	2	U
8	7	3	U
8	7	4	U
8	7	5	U
8	7	6	U
8	7	7	G
8	7	8	A
8	7	9	U
8	7	10	U
8	7	12	G
8	7	13	G
10	A	2	G
10	A	6	G
10	A	7	G
10	A	8	U
10	A	10	G
10	A	13	C
10	A	14	A
10	A	15	G
10	A	16	C
10	A	17	C
10	A	18	G
10	A	19	G
10	A	20	U
10	A	21	A
10	A	22	G
10	A	23	C
10	A	46	G
10	A	47	U
10	A	48	C
10	A	49	G
10	A	52	G
10	A	57	A
10	A	58	A
10	A	59	A
10	A	61	C
10	A	66	C
10	A	69	C
10	A	71	C
10	A	73	A
10	B	2	G

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Mol	Chain	Res	Type
10	B	6	G
10	B	7	G
10	B	8	U
10	B	10	G
10	B	13	C
10	B	14	A
10	B	15	G
10	B	16	C
10	B	17	C
10	B	18	G
10	B	19	G
10	B	20	U
10	B	21	A
10	B	22	G
10	B	23	C
10	B	30	G
10	B	31	G
10	B	32	C
10	B	36	U
10	B	37	A
10	B	38	A
10	B	46	G
10	B	47	U
10	B	48	C
10	B	49	G
10	B	52	G
10	B	57	A
10	B	58	A
10	B	59	A
10	B	61	C
10	B	66	C
10	B	69	C
10	B	71	C
10	B	73	A
15	D	4	U
15	D	5	U
15	D	9	G
15	D	22	G
15	D	29	U
15	D	32	A
15	D	39	G
15	D	41	G

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Mol	Chain	Res	Type
15	D	47	C
15	D	48	C
15	D	50	A
15	D	51	A
15	D	52	C
15	D	54	C
15	D	69	G
15	D	70	U
15	D	71	A
15	D	72	A
15	D	74	A
15	D	76	G
15	D	82	G
15	D	83	C
15	D	84	U
15	D	87	C
15	D	90	C
15	D	94	G
15	D	95	C
15	D	96	U
15	D	108	G
15	D	120	A
15	D	122	G
15	D	128	G
15	D	131	A
15	D	141	G
15	D	144	G
15	D	148	G
15	D	149	A
15	D	160	A
15	D	164	G
15	D	173	U
15	D	181	A
15	D	182	A
15	D	197	A
15	D	198	G
15	D	204	G
15	D	208	U
15	D	209	U
15	D	210	C
15	D	211	G
15	D	212	G

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Mol	Chain	Res	Type
15	D	216	U
15	D	226	G
15	D	245	U
15	D	247	G
15	D	251	G
15	D	258	G
15	D	262	A
15	D	266	G
15	D	267	C
15	D	271	C
15	D	279	A
15	D	289	G
15	D	299	G
15	D	306	A
15	D	321	A
15	D	328	C
15	D	329	A
15	D	332	G
15	D	347	G
15	D	352	C
15	D	353	A
15	D	354	G
15	D	355	C
15	D	367	U
15	D	372	C
15	D	373	A
15	D	376	G
15	D	382	A
15	D	384	G
15	D	392	C
15	D	393	A
15	D	397	A
15	D	406	G
15	D	412	A
15	D	413	G
15	D	414	A
15	D	421	U
15	D	422	C
15	D	424	G
15	D	429	U
15	D	446	G
15	D	451	A

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Mol	Chain	Res	Type
15	D	457	G
15	D	458	U
15	D	460	A
15	D	463	U
15	D	464	U
15	D	467	U
15	D	468	A
15	D	469	C
15	D	478	A
15	D	479	U
15	D	481	G
15	D	484	G
15	D	485	U
15	D	486	U
15	D	505	G
15	D	509	A
15	D	511	C
15	D	518	C
15	D	519	C
15	D	526	C
15	D	531	U
15	D	532	A
15	D	533	A
15	D	542	G
15	D	547	A
15	D	559	A
15	D	562	U
15	D	568	G
15	D	572	A
15	D	573	A
15	D	576	C
15	D	577	G
15	D	579	A
15	D	596	A
15	D	628	G
15	D	633	G
15	D	642	A
15	D	649	A
15	D	650	G
15	D	653	U
15	D	665	A
15	D	666	G

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Mol	Chain	Res	Type
15	D	687	A
15	D	700	G
15	D	723	U
15	D	724	G
15	D	731	G
15	D	734	G
15	D	747	A
15	D	748	G
15	D	755	G
15	D	760	G
15	D	777	A
15	D	793	U
15	D	794	A
15	D	815	A
15	D	817	C
15	D	828	U
15	D	829	G
15	D	832	G
15	D	841	C
15	D	844	G
15	D	845	A
15	D	849	G
15	D	874	G
15	D	887	G
15	D	902	G
15	D	914	A
15	D	916	U
15	D	926	G
15	D	934	C
15	D	935	A
15	D	954	G
15	D	960	U
15	D	963	G
15	D	969	A
15	D	972	C
15	D	975	A
15	D	976	G
15	D	991	U
15	D	992	U
15	D	993	G
15	D	996	A
15	D	999	C

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Mol	Chain	Res	Type
15	D	1004	A
15	D	1008	U
15	D	1009	U
15	D	1017	U
15	D	1018	G
15	D	1021	A
15	D	1024	G
15	D	1026	G
15	D	1028	C
15	D	1030	U
15	D	1031	C
15	D	1037	C
15	D	1043	G
15	D	1044	A
15	D	1046	A
15	D	1065	U
15	D	1085	U
15	D	1086	U
15	D	1094	G
15	D	1095	U
15	D	1099	G
15	D	1101	A
15	D	1124	G
15	D	1133	G
15	D	1135	U
15	D	1136	C
15	D	1137	C
15	D	1139	G
15	D	1140	C
15	D	1141	C
15	D	1142	G
15	D	1143	G
15	D	1145	A
15	D	1146	A
15	D	1151	A
15	D	1152	A
15	D	1158	C
15	D	1159	U
15	D	1167	A
15	D	1171	A
15	D	1174	G
15	D	1175	G

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Mol	Chain	Res	Type
15	D	1176	A
15	D	1184	G
15	D	1196	A
15	D	1197	A
15	D	1206	G
15	D	1211	U
15	D	1212	U
15	D	1213	A
15	D	1214	C
15	D	1215	G
15	D	1226	C
15	D	1227	A
15	D	1228	C
15	D	1238	A
15	D	1256	A
15	D	1257	A
15	D	1260	G
15	D	1275	A
15	D	1276	G
15	D	1278	G
15	D	1279	G
15	D	1280	A
15	D	1285	A
15	D	1286	U
15	D	1287	A
15	D	1299	A
15	D	1300	G
15	D	1302	C
15	D	1305	G
15	D	1312	G
15	D	1317	C
15	D	1320	C
15	D	1323	G
15	D	1329	A
15	D	1338	G
15	D	1340	A
15	D	1346	A
15	D	1347	G
15	D	1353	G
15	D	1363	A
15	D	1370	G
15	D	1378	C

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Mol	Chain	Res	Type
15	D	1379	G
15	D	1381	U
15	D	1391	U
15	D	1396	A
15	D	1397	C
15	D	1398	A
15	D	1404	C
15	D	1419	G
15	D	1429	A
15	D	1441	A
15	D	1446	A
15	D	1447	A
15	D	1448	C
15	D	1452	C
15	D	1453	G
15	D	1475	G
15	D	1487	G
15	D	1492	A
15	D	1493	A
15	D	1494	G
15	D	1495	U
15	D	1497	G
15	D	1503	A
15	D	1506	U
15	D	1517	G
15	D	1529	G
15	D	1530	G
15	D	1534	A
38	a	10	A
38	a	15	G
38	a	34	U
38	a	35	G
38	a	46	G
38	a	58	G
38	a	60	G
38	a	63	A
38	a	71	A
38	a	74	A
38	a	75	G
38	a	83	A
38	a	84	A
38	a	85	G

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Mol	Chain	Res	Type
38	a	93	G
38	a	96	C
38	a	102	U
38	a	103	A
38	a	110	G
38	a	114	U
38	a	118	A
38	a	119	A
38	a	120	U
38	a	122	G
38	a	131	A
38	a	136	G
38	a	139	U
38	a	140	C
38	a	141	G
38	a	145	C
38	a	163	C
38	a	165	A
38	a	181	A
38	a	196	A
38	a	200	U
38	a	215	G
38	a	216	A
38	a	222	A
38	a	225	C
38	a	248	G
38	a	249	C
38	a	261	G
38	a	264	C
38	a	265	A
38	a	266	G
38	a	267	C
38	a	271	G
38	a	272	A
38	a	275	C
38	a	276	U
38	a	278	A
38	a	285	G
38	a	311	A
38	a	324	A
38	a	329	G
38	a	330	A

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Mol	Chain	Res	Type
38	a	353	C
38	a	359	G
38	a	361	G
38	a	362	A
38	a	371	A
38	a	372	G
38	a	373	U
38	a	375	G
38	a	383	C
38	a	386	G
38	a	396	G
38	a	405	U
38	a	411	G
38	a	412	A
38	a	420	C
38	a	424	G
38	a	435	C
38	a	451	U
38	a	456	C
38	a	457	A
38	a	477	A
38	a	481	G
38	a	491	G
38	a	501	A
38	a	503	A
38	a	504	A
38	a	505	A
38	a	509	C
38	a	522	A
38	a	529	A
38	a	532	A
38	a	543	G
38	a	546	U
38	a	547	A
38	a	548	G
38	a	549	G
38	a	551	G
38	a	563	A
38	a	569	U
38	a	573	U
38	a	575	A
38	a	588	U

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Mol	Chain	Res	Type
38	a	603	A
38	a	609	A
38	a	613	A
38	a	614	A
38	a	615	U
38	a	616	A
38	a	618	G
38	a	621	A
38	a	627	A
38	a	637	A
38	a	645	C
38	a	647	G
38	a	654	A
38	a	664	G
38	a	668	A
38	a	685	A
38	a	686	U
38	a	710	U
38	a	717	C
38	a	730	A
38	a	738	G
38	a	757	G
38	a	764	A
38	a	765	C
38	a	775	G
38	a	776	G
38	a	782	A
38	a	784	G
38	a	785	G
38	a	800	A
38	a	802	A
38	a	805	G
38	a	812	C
38	a	819	A
38	a	827	U
38	a	828	U
38	a	845	A
38	a	846	U
38	a	858	G
38	a	859	G
38	a	869	G
38	a	878	A

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Mol	Chain	Res	Type
38	a	881	G
38	a	884	U
38	a	885	C
38	a	888	C
38	a	891	G
38	a	892	A
38	a	893	C
38	a	895	U
38	a	896	A
38	a	897	C
38	a	899	A
38	a	907	G
38	a	910	A
38	a	914	G
38	a	915	C
38	a	931	U
38	a	941	A
38	a	945	A
38	a	946	C
38	a	953	G
38	a	961	C
38	a	974	G
38	a	983	A
38	a	995	C
38	a	996	A
38	a	999	U
38	a	1005	C
38	a	1012	U
38	a	1013	C
38	a	1022	G
38	a	1023	U
38	a	1026	G
38	a	1033	U
38	a	1041	G
38	a	1045	C
38	a	1046	A
38	a	1047	G
38	a	1060	U
38	a	1061	U
38	a	1062	G
38	a	1063	G
38	a	1064	C

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Mol	Chain	Res	Type
38	a	1065	U
38	a	1066	U
38	a	1067	A
38	a	1068	G
38	a	1069	A
38	a	1070	A
38	a	1071	G
38	a	1073	A
38	a	1074	G
38	a	1076	C
38	a	1079	C
38	a	1080	A
38	a	1081	U
38	a	1082	U
38	a	1083	U
38	a	1084	A
38	a	1087	G
38	a	1088	A
38	a	1090	A
38	a	1095	A
38	a	1096	A
38	a	1107	G
38	a	1110	G
38	a	1111	A
38	a	1112	G
38	a	1119	U
38	a	1122	G
38	a	1132	U
38	a	1134	A
38	a	1135	C
38	a	1142	A
38	a	1169	A
38	a	1170	C
38	a	1173	U
38	a	1174	U
38	a	1175	A
38	a	1176	U
38	a	1177	G
38	a	1178	C
38	a	1179	G
38	a	1180	U
38	a	1186	G

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Mol	Chain	Res	Type
38	a	1238	G
38	a	1248	G
38	a	1253	A
38	a	1256	G
38	a	1266	G
38	a	1271	G
38	a	1272	A
38	a	1273	U
38	a	1301	A
38	a	1321	A
38	a	1345	C
38	a	1352	U
38	a	1365	A
38	a	1368	G
38	a	1378	A
38	a	1379	U
38	a	1380	G
38	a	1383	A
38	a	1387	A
38	a	1392	A
38	a	1395	A
38	a	1406	U
38	a	1407	G
38	a	1408	G
38	a	1411	U
38	a	1414	C
38	a	1415	U
38	a	1416	G
38	a	1417	C
38	a	1419	A
38	a	1420	A
38	a	1428	C
38	a	1452	G
38	a	1453	A
38	a	1460	U
38	a	1478	G
38	a	1482	G
38	a	1490	A
38	a	1497	U
38	a	1503	A
38	a	1508	A
38	a	1509	A

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Mol	Chain	Res	Type
38	a	1510	G
38	a	1515	A
38	a	1529	G
38	a	1534	U
38	a	1535	A
38	a	1536	C
38	a	1537	G
38	a	1554	U
38	a	1559	U
38	a	1566	A
38	a	1569	A
38	a	1578	U
38	a	1580	A
38	a	1581	G
38	a	1582	C
38	a	1583	A
38	a	1584	U
38	a	1589	U
38	a	1590	A
38	a	1608	A
38	a	1609	A
38	a	1610	A
38	a	1647	U
38	a	1648	U
38	a	1649	G
38	a	1651	G
38	a	1674	G
38	a	1677	A
38	a	1703	G
38	a	1714	U
38	a	1715	G
38	a	1718	G
38	a	1729	U
38	a	1730	C
38	a	1732	C
38	a	1738	G
38	a	1750	G
38	a	1755	A
38	a	1758	U
38	a	1764	C
38	a	1773	A
38	a	1791	A

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Mol	Chain	Res	Type
38	a	1800	C
38	a	1801	A
38	a	1808	A
38	a	1811	G
38	a	1816	C
38	a	1829	A
38	a	1833	C
38	a	1847	A
38	a	1848	A
38	a	1858	A
38	a	1859	U
38	a	1862	G
38	a	1864	U
38	a	1869	G
38	a	1870	C
38	a	1872	A
38	a	1873	G
38	a	1905	C
38	a	1906	G
38	a	1907	G
38	a	1913	A
38	a	1914	C
38	a	1919	A
38	a	1920	C
38	a	1922	G
38	a	1923	U
38	a	1924	C
38	a	1925	C
38	a	1926	U
38	a	1928	A
38	a	1929	G
38	a	1930	G
38	a	1936	A
38	a	1938	A
38	a	1955	U
38	a	1965	C
38	a	1967	C
38	a	1970	A
38	a	1971	U
38	a	1972	G
38	a	1987	A
38	a	1991	U

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Mol	Chain	Res	Type
38	a	1992	G
38	a	1993	U
38	a	1997	C
38	a	2002	G
38	a	2022	U
38	a	2023	C
38	a	2027	G
38	a	2033	A
38	a	2043	C
38	a	2051	A
38	a	2052	A
38	a	2055	C
38	a	2056	G
38	a	2060	A
38	a	2061	G
38	a	2062	A
38	a	2077	A
38	a	2097	A
38	a	2099	U
38	a	2100	G
38	a	2108	A
38	a	2110	G
38	a	2111	U
38	a	2113	U
38	a	2115	G
38	a	2116	G
38	a	2117	A
38	a	2118	U
38	a	2121	G
38	a	2122	U
38	a	2124	G
38	a	2125	G
38	a	2126	A
38	a	2127	G
38	a	2128	G
38	a	2131	U
38	a	2132	U
38	a	2133	G
38	a	2134	A
38	a	2139	U
38	a	2141	G
38	a	2146	C

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Mol	Chain	Res	Type
38	a	2147	A
38	a	2154	A
38	a	2157	G
38	a	2158	A
38	a	2159	G
38	a	2162	G
38	a	2163	A
38	a	2164	C
38	a	2165	C
38	a	2169	A
38	a	2171	A
38	a	2172	U
38	a	2178	C
38	a	2182	U
38	a	2183	A
38	a	2185	U
38	a	2188	U
38	a	2189	U
38	a	2190	G
38	a	2191	A
38	a	2193	G
38	a	2194	U
38	a	2198	A
38	a	2204	G
38	a	2210	U
38	a	2211	A
38	a	2212	A
38	a	2213	U
38	a	2225	A
38	a	2226	C
38	a	2229	U
38	a	2238	G
38	a	2239	G
38	a	2244	U
38	a	2250	G
38	a	2268	A
38	a	2278	A
38	a	2283	C
38	a	2287	A
38	a	2297	A
38	a	2305	U
38	a	2308	G

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Mol	Chain	Res	Type
38	a	2309	A
38	a	2315	G
38	a	2322	A
38	a	2325	G
38	a	2327	A
38	a	2333	A
38	a	2339	C
38	a	2345	G
38	a	2347	C
38	a	2350	C
38	a	2361	G
38	a	2372	U
38	a	2376	A
38	a	2383	G
38	a	2385	C
38	a	2402	U
38	a	2403	C
38	a	2406	A
38	a	2423	U
38	a	2424	C
38	a	2425	A
38	a	2426	A
38	a	2429	G
38	a	2430	A
38	a	2431	U
38	a	2434	A
38	a	2435	A
38	a	2441	U
38	a	2447	G
38	a	2448	A
38	a	2470	G
38	a	2474	U
38	a	2476	A
38	a	2478	A
38	a	2484	G
38	a	2491	U
38	a	2502	G
38	a	2506	U
38	a	2507	C
38	a	2512	C
38	a	2513	A
38	a	2518	A

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Mol	Chain	Res	Type
38	a	2520	C
38	a	2525	G
38	a	2529	G
38	a	2535	G
38	a	2547	A
38	a	2554	U
38	a	2566	A
38	a	2567	G
38	a	2572	A
38	a	2573	C
38	a	2574	G
38	a	2585	U
38	a	2586	U
38	a	2602	A
38	a	2603	G
38	a	2609	U
38	a	2610	C
38	a	2611	C
38	a	2613	U
38	a	2629	U
38	a	2663	G
38	a	2669	G
38	a	2671	G
38	a	2689	U
38	a	2690	U
38	a	2714	G
38	a	2722	G
38	a	2726	A
38	a	2744	G
38	a	2748	A
38	a	2757	A
38	a	2758	A
38	a	2765	A
38	a	2777	G
38	a	2778	A
38	a	2791	G
38	a	2793	C
38	a	2796	U
38	a	2797	U
38	a	2798	U
38	a	2799	A
38	a	2801	G

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Mol	Chain	Res	Type
38	a	2818	U
38	a	2820	A
38	a	2823	A
38	a	2825	G
38	a	2849	U
38	a	2850	A
38	a	2859	G
38	a	2861	U
38	a	2867	G
38	a	2880	C
38	a	2884	U
38	a	2885	G
38	a	2891	U
38	a	2902	C
41	d	2	G
41	d	9	G
41	d	13	G
41	d	16	G
41	d	17	C
41	d	35	C
41	d	36	C
41	d	45	A
41	d	51	G
41	d	56	G
41	d	64	G
41	d	66	A
41	d	88	C
41	d	89	U
41	d	90	C
41	d	99	A
41	d	109	A

All (50) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
8	7	-8	U
8	7	-5	U
8	7	-3	U
10	A	6	G
10	A	7	G
10	A	9	G
10	A	22	G

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Mol	Chain	Res	Type
10	A	60	U
10	A	70	G
10	B	6	G
10	B	7	G
10	B	9	G
10	B	22	G
10	B	37	A
10	B	60	U
15	D	7	A
15	D	70	U
15	D	121	U
15	D	181	A
15	D	183	C
15	D	197	A
15	D	209	U
15	D	305	G
15	D	328	C
15	D	428	G
15	D	496	A
15	D	517	G
15	D	531	U
15	D	532	A
15	D	562	U
15	D	641	U
15	D	722	G
15	D	793	U
15	D	991	U
15	D	992	U
15	D	1109	C
15	D	1145	A
15	D	1196	A
15	D	1211	U
15	D	1212	U
15	D	1213	A
15	D	1214	C
15	D	1225	A
15	D	1299	A
15	D	1396	A
15	D	1432	G
15	D	1447	A
15	D	1491	G
15	D	1492	A

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Mol	Chain	Res	Type
15	D	1493	A

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 3 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.

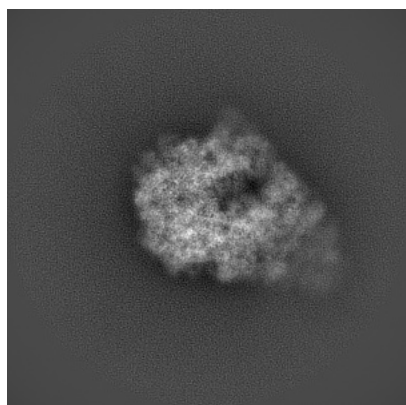
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-21494. These allow visual inspection of the internal detail of the map and identification of artifacts.

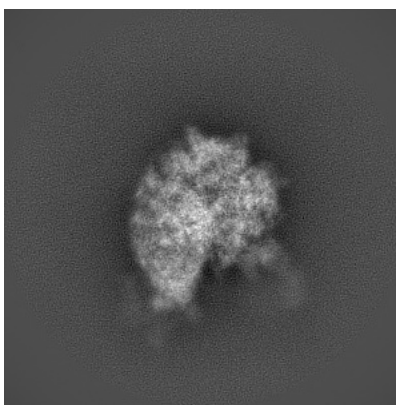
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

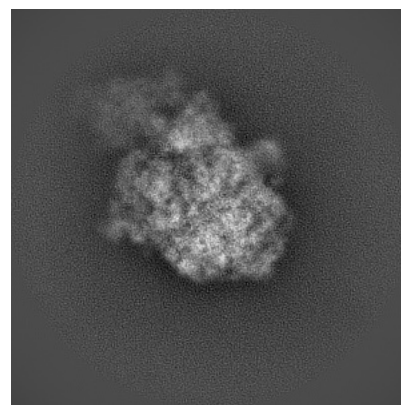
6.1.1 Primary map



X



Y

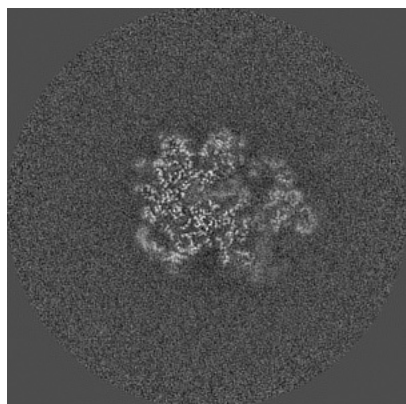


Z

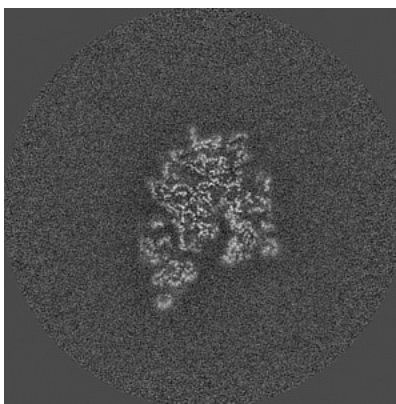
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

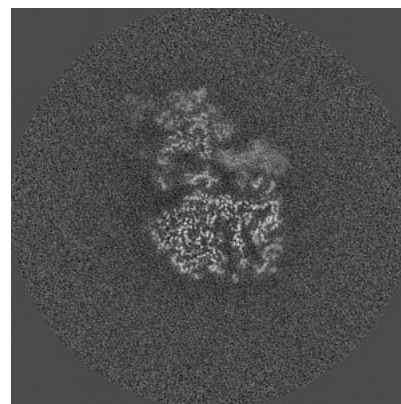
6.2.1 Primary map



X Index: 256



Y Index: 256

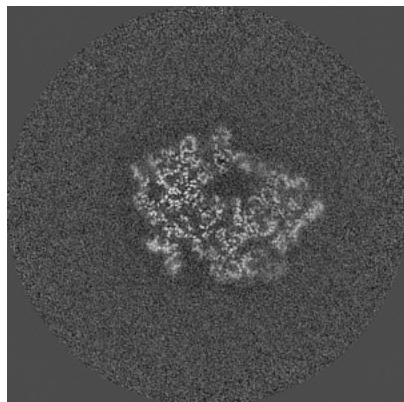


Z Index: 256

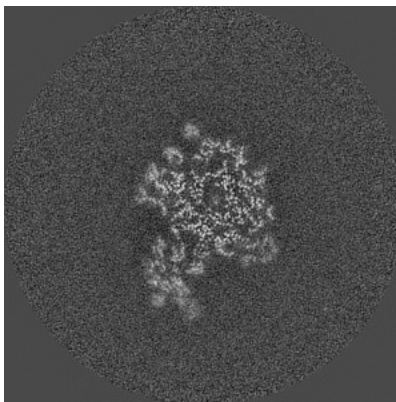
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

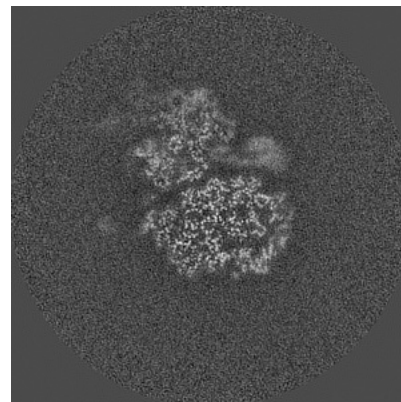
6.3.1 Primary map



X Index: 240



Y Index: 231

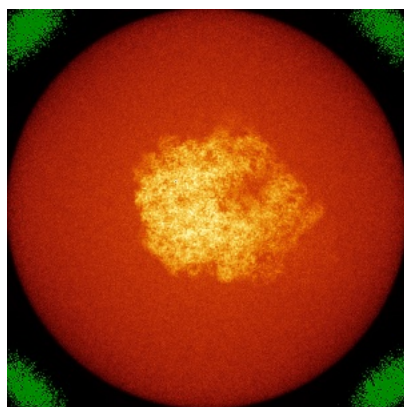


Z Index: 248

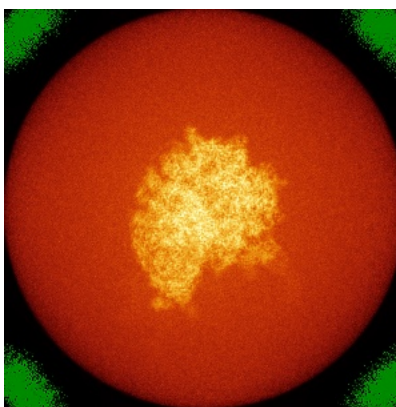
The images above show the largest variance slices of the map in three orthogonal directions.

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

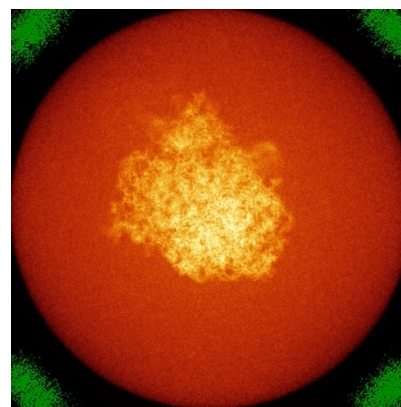
6.4.1 Primary map



X



Y

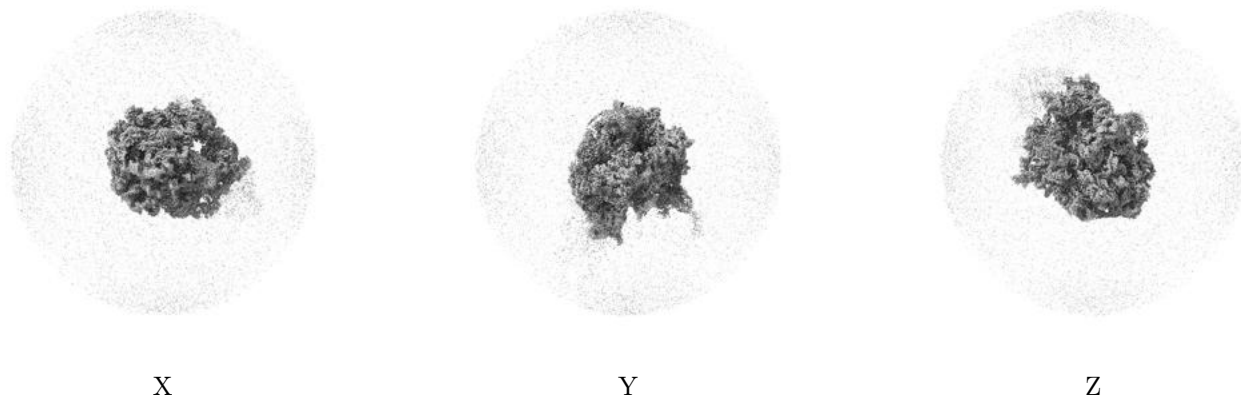


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.017. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

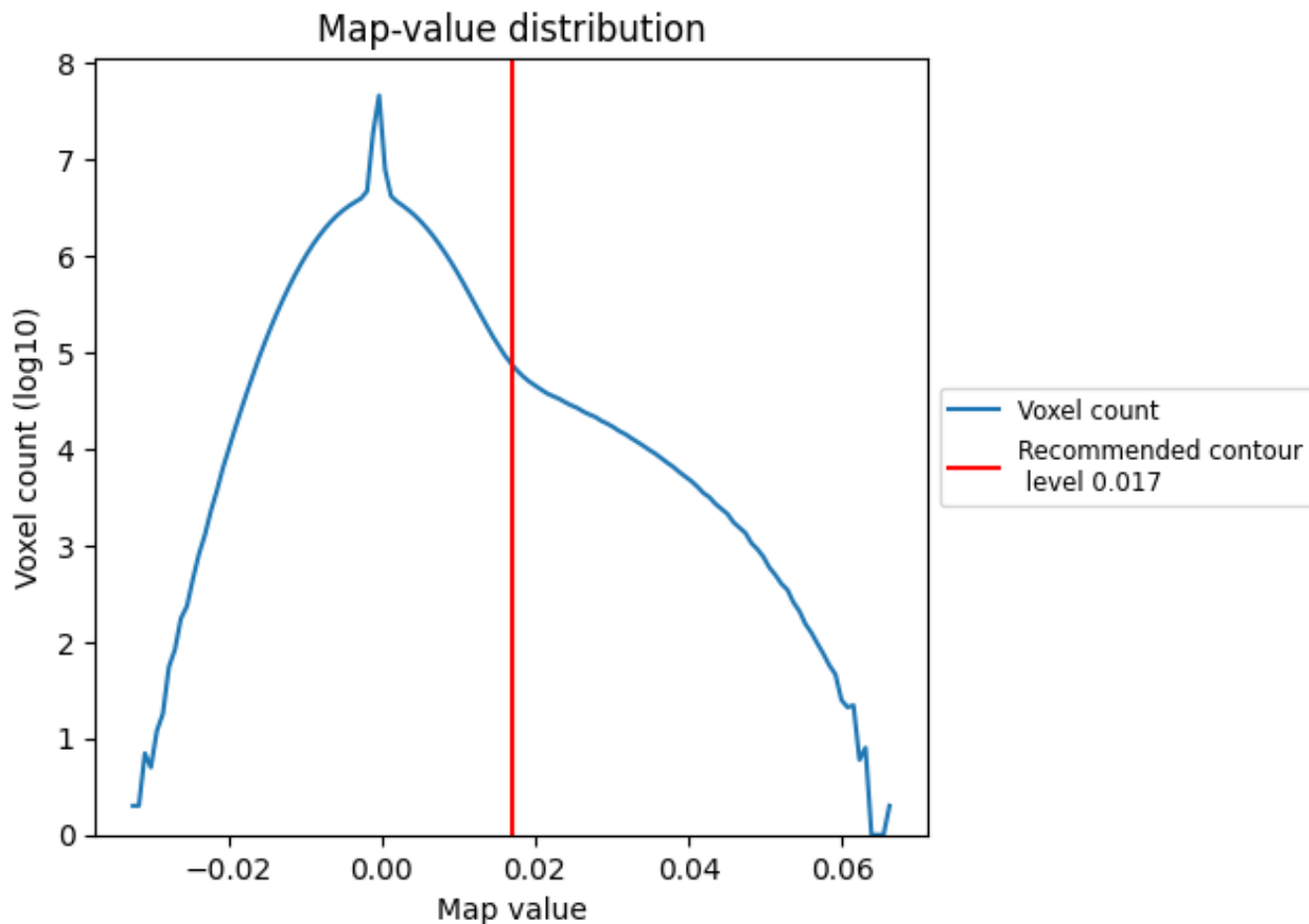
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

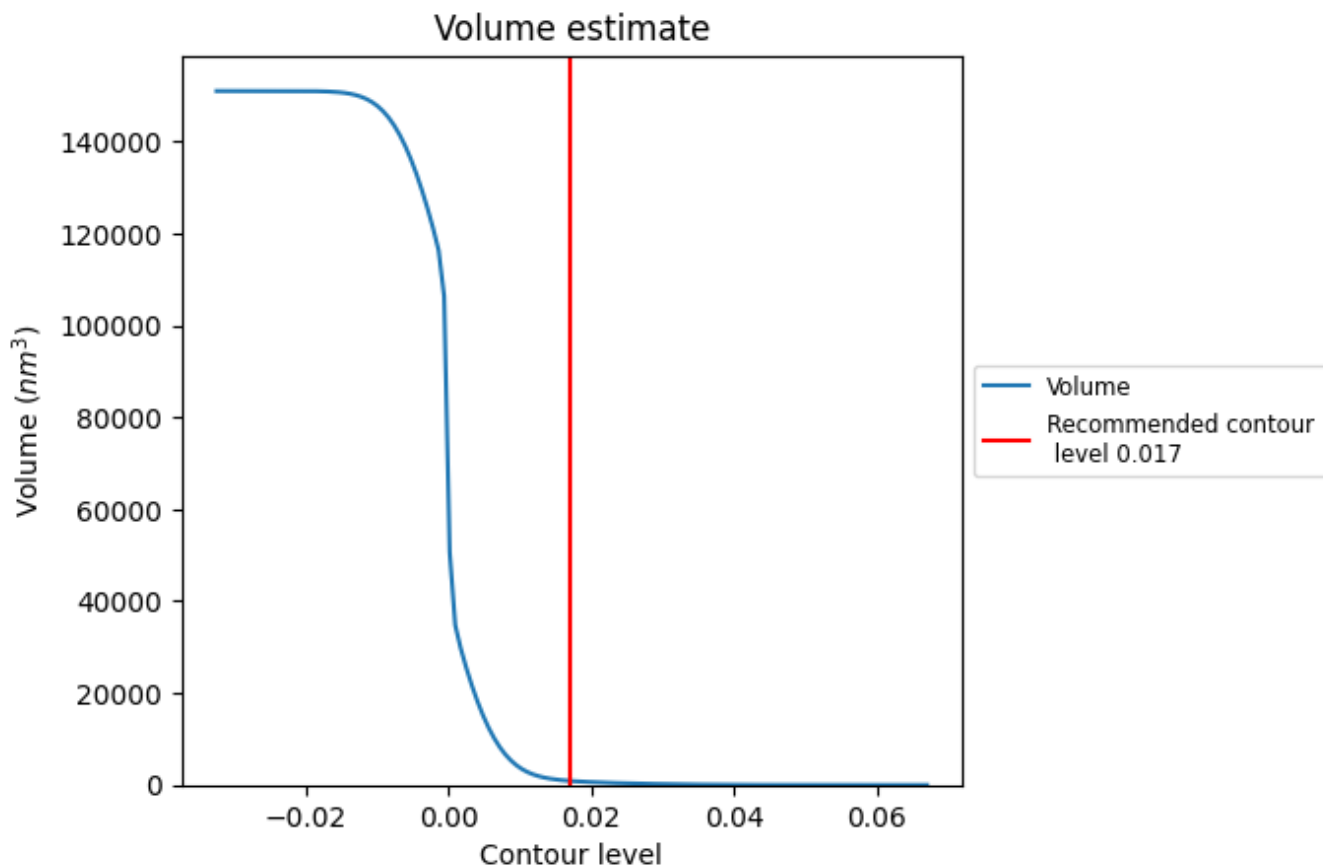
This section contains the results of statistical analysis of the map.

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.

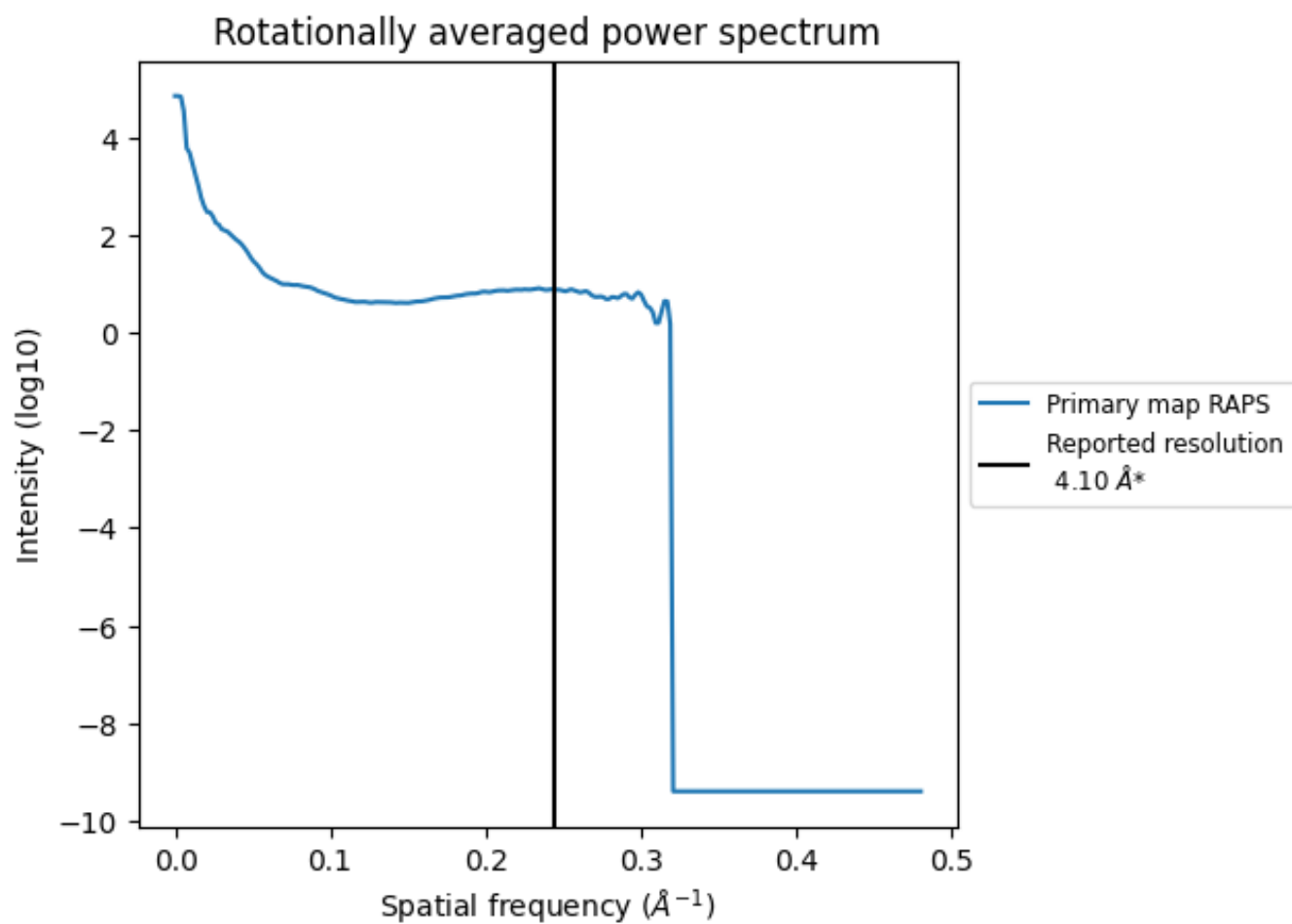
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 887 nm^3 ; this corresponds to an approximate mass of 801 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 0.244 Å⁻¹

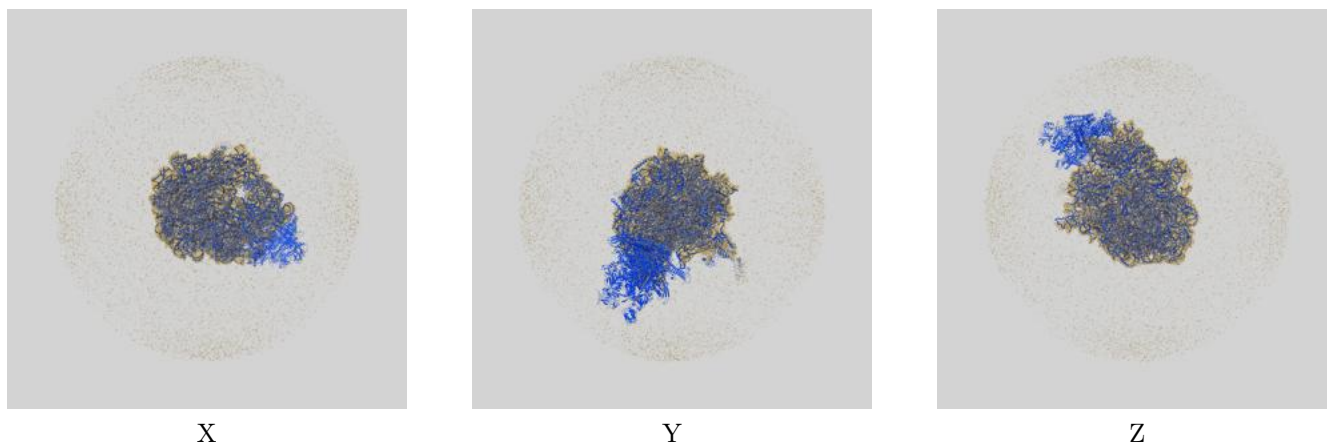
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

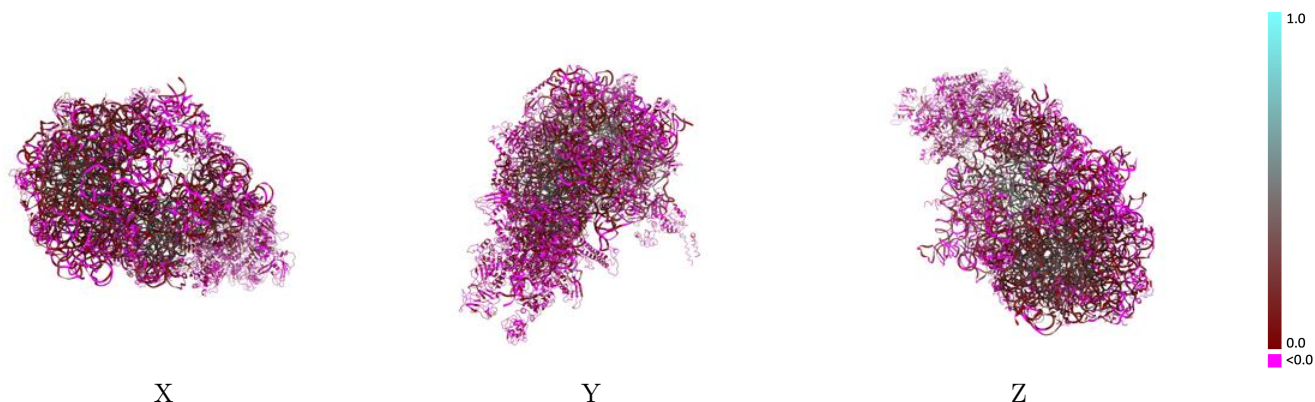
This section contains information regarding the fit between EMDB map EMD-21494 and PDB model 6VZJ. Per-residue inclusion information can be found in section 3 on page 16.

9.1 Map-model overlay [i](#)



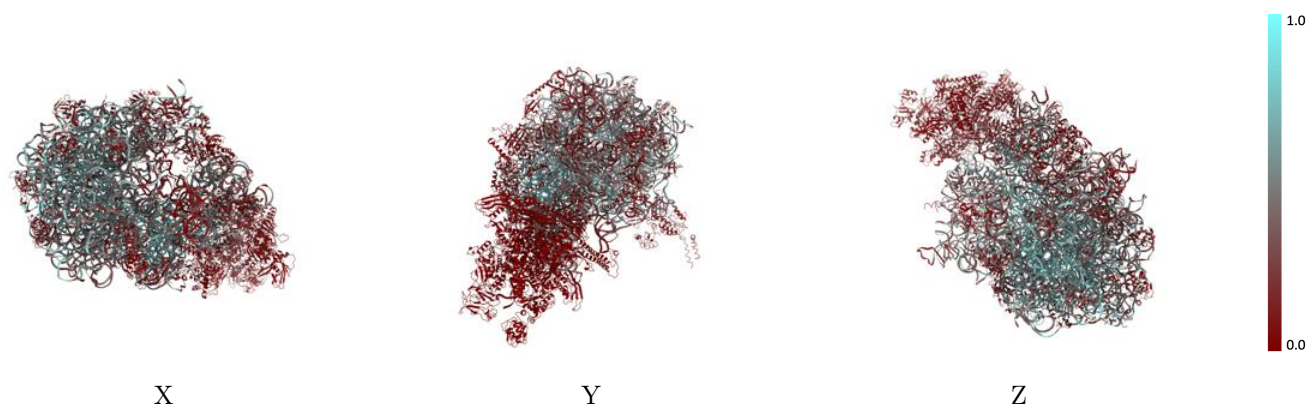
The images above show the 3D surface view of the map at the recommended contour level 0.017 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



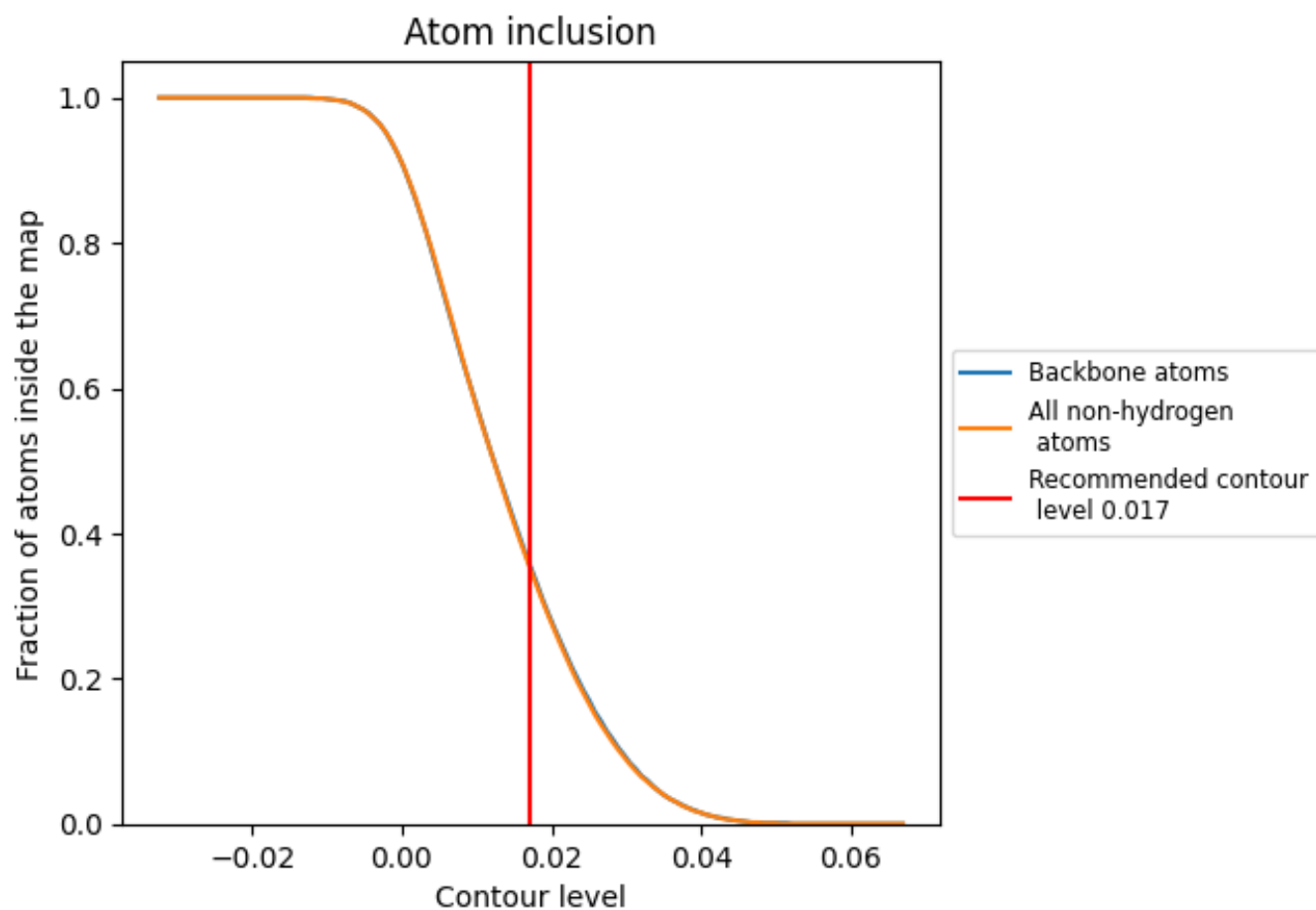
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.017).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 36% of all backbone atoms, 36% 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 (0.017) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.3560	 0.1230
0	 0.3230	 0.1140
1	 0.4280	 0.2450
2	 0.2510	 0.0600
3	 0.2310	 0.0170
4	 0.2580	 0.0510
5	 0.0020	 -0.0050
6	 0.0050	 0.0520
7	 0.0130	 0.0190
9	 0.0700	 0.0020
A	 0.1760	 0.0960
AA	 0.0020	 0.0230
AC	 0.0020	 0.0180
AD	 0.0010	 0.0130
AE	 0.0020	 0.0180
B	 0.1270	 0.0350
C	 0.2410	 0.0790
D	 0.5260	 0.1880
E	 0.2120	 0.0040
F	 0.2200	 0.1780
G	 0.2310	 0.1020
H	 0.0080	 0.0140
I	 0.2080	 0.1290
J	 0.2270	 0.1030
K	 0.4110	 0.2670
L	 0.1620	 0.0260
M	 0.1900	 0.1040
N	 0.3250	 0.1810
O	 0.2000	 0.0480
P	 0.2030	 0.0890
Q	 0.2470	 0.1310
R	 0.4360	 0.3000
S	 0.2180	 0.0610
T	 0.3150	 0.1390
U	 0.1470	 -0.0110



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Chain	Atom inclusion	Q-score
V	0.2770	0.1500
W	0.0910	0.0010
X	0.1420	-0.0100
Y	0.0440	-0.0160
Z	0.0130	-0.0140
a	0.5300	0.1630
b	0.2330	0.0450
c	0.2750	0.0890
d	0.4500	0.0400
e	0.2490	0.0100
f	0.3330	0.1300
g	0.0960	-0.0160
h	0.3070	0.1140
i	0.4580	0.2290
j	0.3760	0.1720
k	0.1790	-0.0210
l	0.2700	0.0700
m	0.4840	0.2710
n	0.1680	0.0010
o	0.2440	0.0650
p	0.1910	0.0070
q	0.3190	0.1040
r	0.0770	-0.0010
s	0.3690	0.1680
t	0.3700	0.2120
u	0.2880	0.0750
v	0.3430	0.1570
w	0.3980	0.1670
x	0.1890	-0.0690
y	0.2610	0.1010
z	0.4500	0.2090