



## Full wwPDB EM Validation Report ⓘ

Nov 15, 2022 – 05:26 PM EST

PDB ID : 6XIJ  
EMDB ID : EMD-22193  
Title : Escherichia coli transcription-translation complex A (TTC-A) containing an  
24 nt long mRNA spacer, NusG, and fMet-tRNAs at E-site and P-site  
Authors : Molodtsov, V.; Wang, C.; Su, M.; Ebright, R.H.  
Deposited on : 2020-06-20  
Resolution : 8.00 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](mailto: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>.

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

EMDB validation analysis : 0.0.1.dev43  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

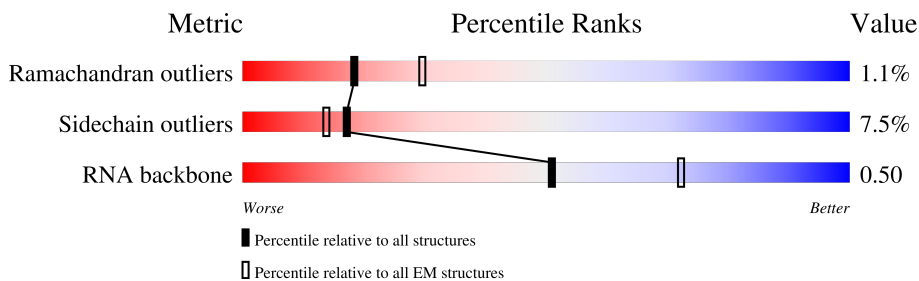
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 8.00 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	
2	1	110	
3	2	100	
4	3	104	
5	4	94	
6	5	36	
7	6	36	
8	7	33	

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Mol	Chain	Length	Quality of chain
9	9	165	68% 54% 33% 10%
10	A	76	29% 58% 38%
10	B	76	38% 46% 49% 5%
11	AA	1342	91% 89% 8%
12	AB	181	54% 53% 46%
13	AC	329	68% 64% 5% 30%
13	AD	329	68% 68% 31%
14	AE	1407	92% 89% 5% 5%
15	C	75	48% 85% 12%
16	D	1542	78% 20%
17	E	87	46% 93% 6%
18	F	71	65% 94%
19	G	241	43% 90% 7%
20	H	557	46% 41% 54%
21	I	233	57% 86% 11%
22	J	206	53% 96%
23	K	167	42% 89% 5% 7%
24	L	135	36% 72% 23%
25	M	179	48% 80% 16%
26	N	130	44% 97%
27	O	130	52% 93% 5%
28	P	103	50% 87% 9%
29	Q	129	49% 87% 9%
30	R	124	48% 92% 6%
31	S	101	43% 95%

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Mol	Chain	Length	Quality of chain
32	T	89	42% 85% 13%
33	U	82	52% 93% 7%
34	V	84	48% 93% 5%
35	W	92	57% 86% 10%
36	X	118	64% 88% 10%
37	Y	142	83% 68% 27%
38	Z	121	24% 12% 75%
39	a	2904	81% 18%
40	b	85	35% 88% 11%
41	c	78	50% 94% 5%
42	d	120	86% 14%
43	e	63	38% 97%
44	f	59	25% 95%
45	g	70	64% 86% 9% 6%
46	h	273	50% 93% 7%
47	i	57	42% 88% 11%
48	j	209	43% 97%
49	k	55	49% 89% 5% 5%
50	l	201	44% 93% 7%
51	m	46	41% 93% 7%
52	n	179	55% 89% 10%
53	o	65	60% 91% 8%
54	p	177	50% 97%
55	q	38	53% 95% 5%
56	r	149	77% 93% 7%

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Mol	Chain	Length	Quality of chain
57	s	142	<p>44% 96% 5%</p>
58	t	123	<p>73% 95% 5%</p>
59	u	144	<p>46% 96% 5%</p>
60	v	136	<p>46% 96% 5%</p>
61	w	127	<p>24% 87% 6% 6%</p>
62	x	117	<p>43% 94% 5%</p>
63	y	115	<p>66% 95% 5%</p>
64	z	118	<p>30% 96% 5%</p>

## 2 Entry composition [i](#)

There are 66 unique types of molecules in this entry. The entry contains 300463 atoms, of which 124723 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
7	6	27	Total	C	H	N	O	P	0	0
			847	259	305	89	167	27		

- Molecule 8 is a RNA chain called mRNA with 24 nt long spacer.

Mol	Chain	Residues	Atoms						AltConf	Trace
8	7	22	Total	C	H	N	O	P	0	0
			564	208	97	74	163	22		

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

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

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

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

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

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

- Molecule 12 is a protein called Transcription termination/antitermination protein NusG.

Mol	Chain	Residues	Atoms						AltConf	Trace
12	AB	98	Total	C	H	N	O	S	0	0
			1573	505	783	139	140	6		

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

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

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

- Molecule 14 is a protein called DNA-directed RNA polymerase subunit beta'.

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

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AE	1384	VAL	MET	conflict	UNP A0A4S1NBU2

- Molecule 15 is a protein called 30S ribosomal protein S18.

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

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

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

- Molecule 17 is a protein called 30S ribosomal protein S20.

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

- Molecule 18 is a protein called 30S ribosomal protein S21.

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

- Molecule 19 is a protein called 30S ribosomal protein S2.



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

- Molecule 20 is a protein called 30S ribosomal protein S1.

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

- Molecule 21 is a protein called 30S ribosomal protein S3.

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

- Molecule 22 is a protein called 30S ribosomal protein S4.

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

- Molecule 23 is a protein called 30S ribosomal protein S5.

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

- Molecule 24 is a protein called 30S ribosomal protein S6.

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

- Molecule 25 is a protein called 30S ribosomal protein S7.

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

- Molecule 26 is a protein called 30S ribosomal protein S8.

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

- Molecule 27 is a protein called 30S ribosomal protein S9.

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

- Molecule 28 is a protein called 30S ribosomal protein S10.

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

- Molecule 29 is a protein called 30S ribosomal protein S11.

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

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

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

- Molecule 31 is a protein called 30S ribosomal protein S14.

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

- Molecule 32 is a protein called 30S ribosomal protein S15.

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

- Molecule 33 is a protein called 30S ribosomal protein S16.

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

- Molecule 34 is a protein called 30S ribosomal protein S17.

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

- Molecule 35 is a protein called 30S ribosomal protein S19.

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

- Molecule 36 is a protein called 30S ribosomal protein S13.

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

- Molecule 37 is a protein called 50S ribosomal protein L11.

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

- Molecule 38 is a protein called 50S ribosomal protein L7/L12.

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

- Molecule 39 is a RNA chain called 23S rRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace	
			Total	C	H	N	O			P
39	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 40 is a protein called 50S ribosomal protein L27.

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

- Molecule 41 is a protein called 50S ribosomal protein L28.

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

- Molecule 42 is a RNA chain called 5S rRNA.

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

- Molecule 43 is a protein called 50S ribosomal protein L29.

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

- Molecule 44 is a protein called 50S ribosomal protein L30.

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

- Molecule 45 is a protein called 50S ribosomal protein L31.

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

- Molecule 46 is a protein called 50S ribosomal protein L2.

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

- Molecule 47 is a protein called 50S ribosomal protein L32.

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

- Molecule 48 is a protein called 50S ribosomal protein L3.

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

- Molecule 49 is a protein called 50S ribosomal protein L33.

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

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

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

- Molecule 51 is a protein called 50S ribosomal protein L34.

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

- Molecule 52 is a protein called 50S ribosomal protein L5.

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

- Molecule 53 is a protein called 50S ribosomal protein L35.

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

- Molecule 54 is a protein called 50S ribosomal protein L6.

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

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

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

- Molecule 56 is a protein called 50S ribosomal protein L9.

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

- Molecule 57 is a protein called 50S ribosomal protein L13.

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

- Molecule 58 is a protein called 50S ribosomal protein L14.

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

- Molecule 59 is a protein called 50S ribosomal protein L15.

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

- Molecule 60 is a protein called 50S ribosomal protein L16.

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

- Molecule 61 is a protein called 50S ribosomal protein L17.

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

- Molecule 62 is a protein called 50S ribosomal protein L18.

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

- Molecule 63 is a protein called 50S ribosomal protein L19.

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

- Molecule 64 is a protein called 50S ribosomal protein L20.

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

- Molecule 65 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

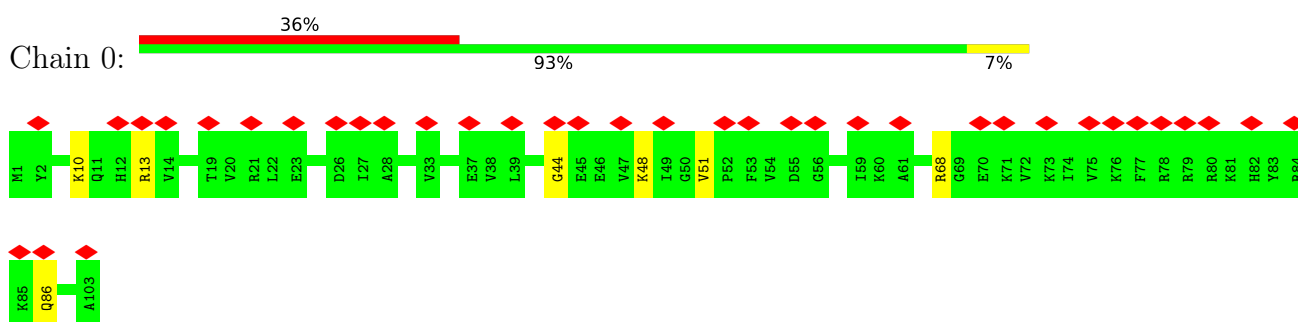
- Molecule 66 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

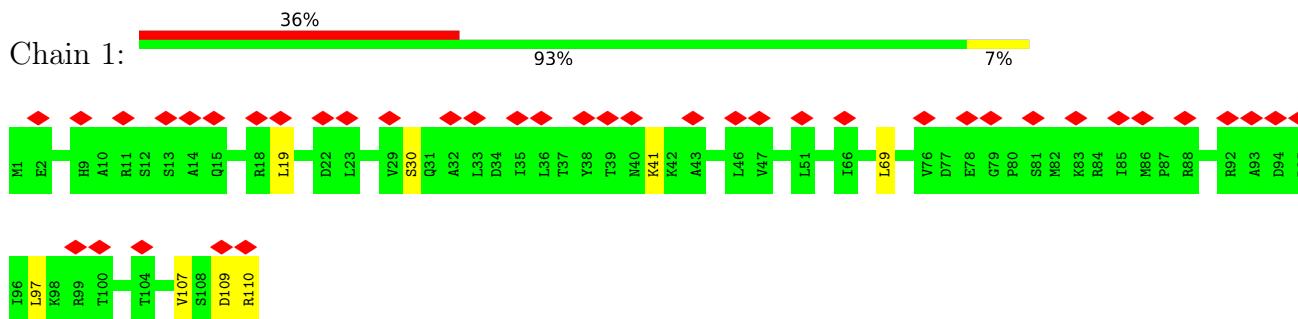
### 3 Residue-property plots [i](#)

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.

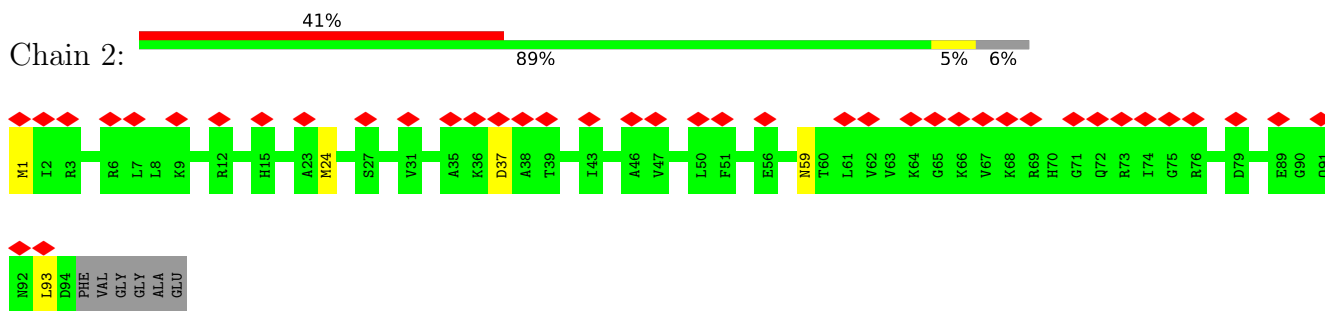
- Molecule 1: 50S ribosomal protein L21



- Molecule 2: 50S ribosomal protein L22



- Molecule 3: 50S ribosomal protein L23



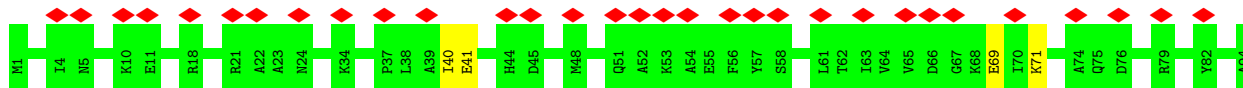
- Molecule 4: 50S ribosomal protein L24



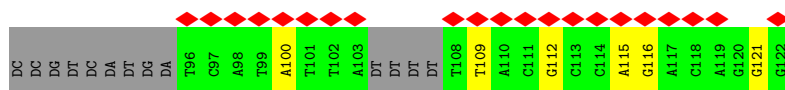




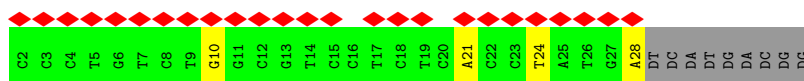
- Molecule 5: 50S ribosomal protein L25



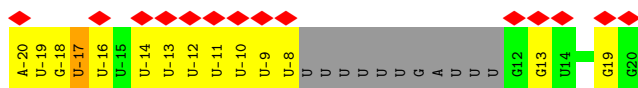
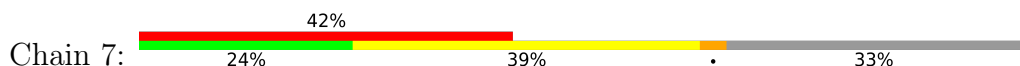
- Molecule 6: NT DNA



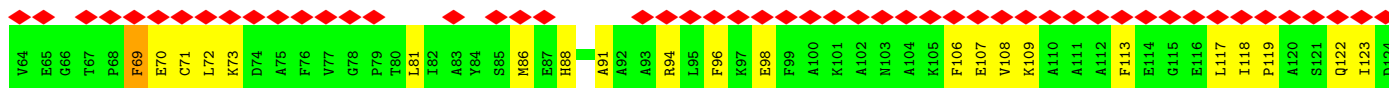
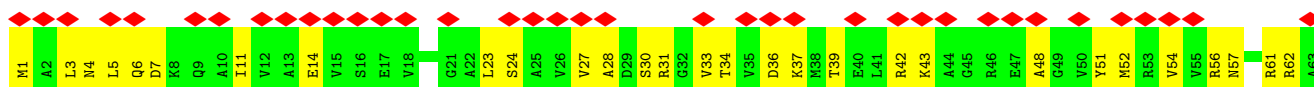
- Molecule 7: T DNA



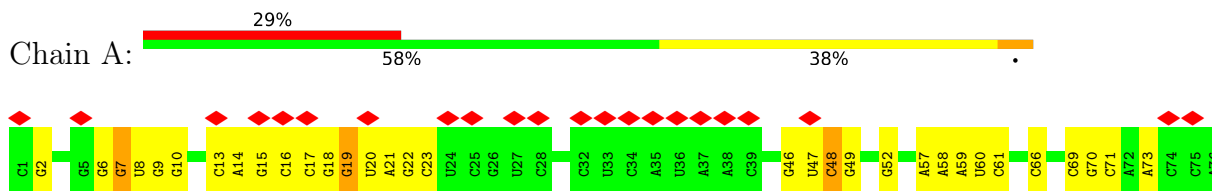
- Molecule 8: mRNA with 24 nt long spacer



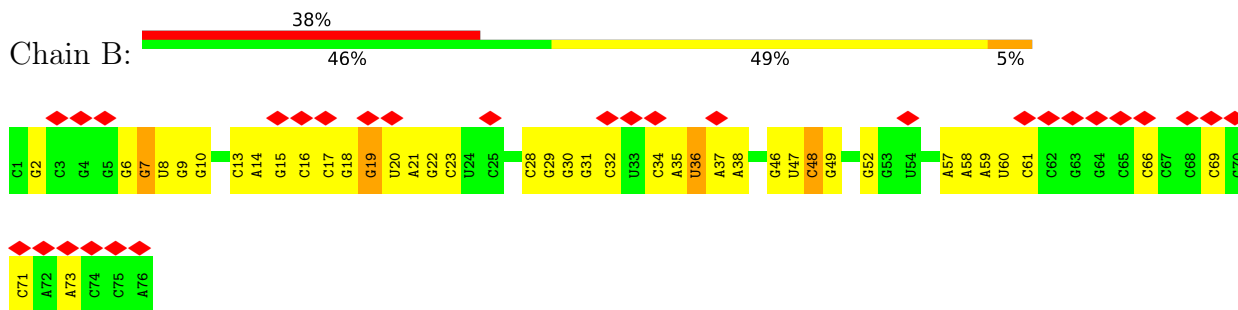
- Molecule 9: 50S ribosomal protein L10



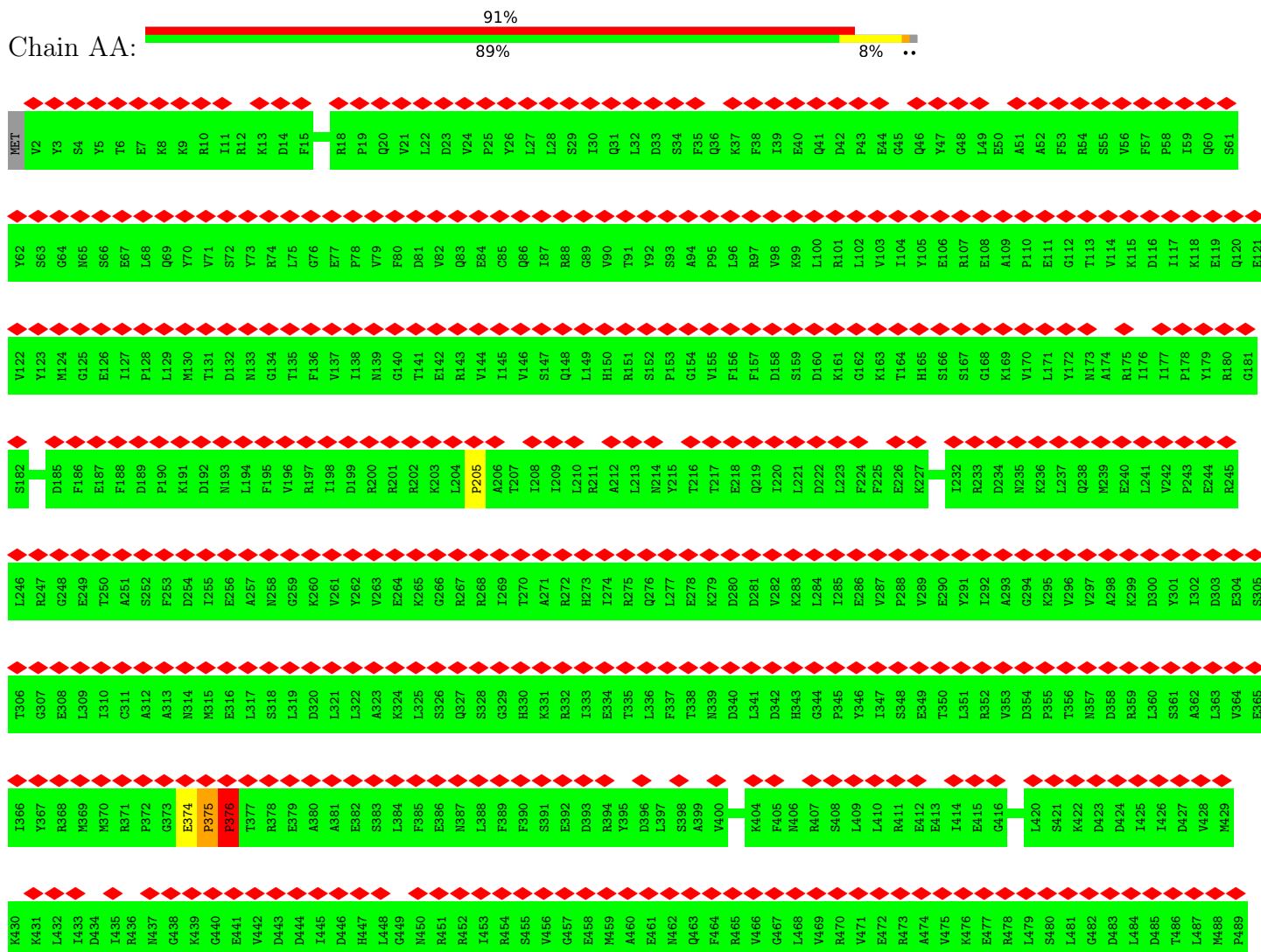
- Molecule 10: E-site and P-site tRNA (fMet)



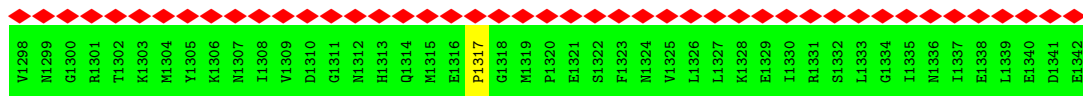
• Molecule 10: E-site and P-site tRNA (fMet)



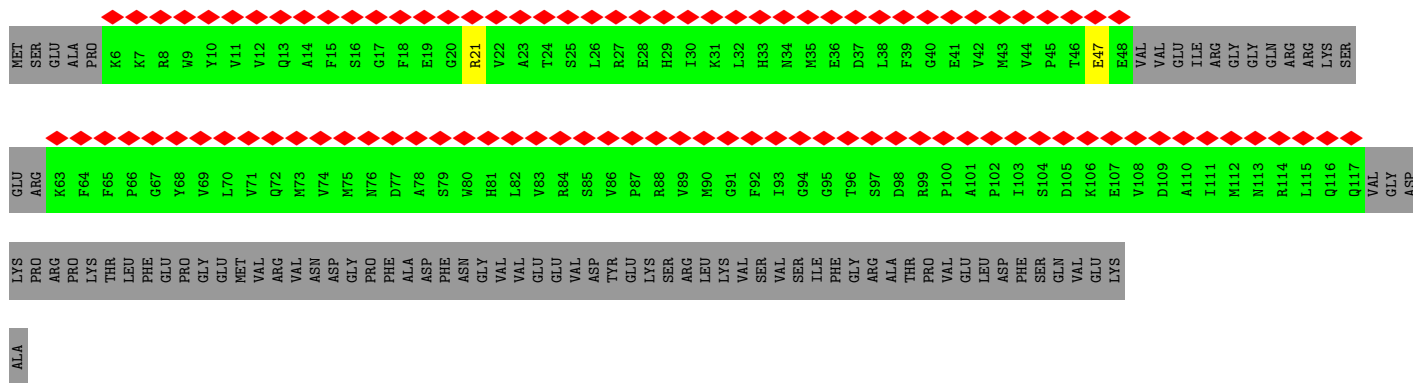
• Molecule 11: DNA-directed RNA polymerase subunit beta



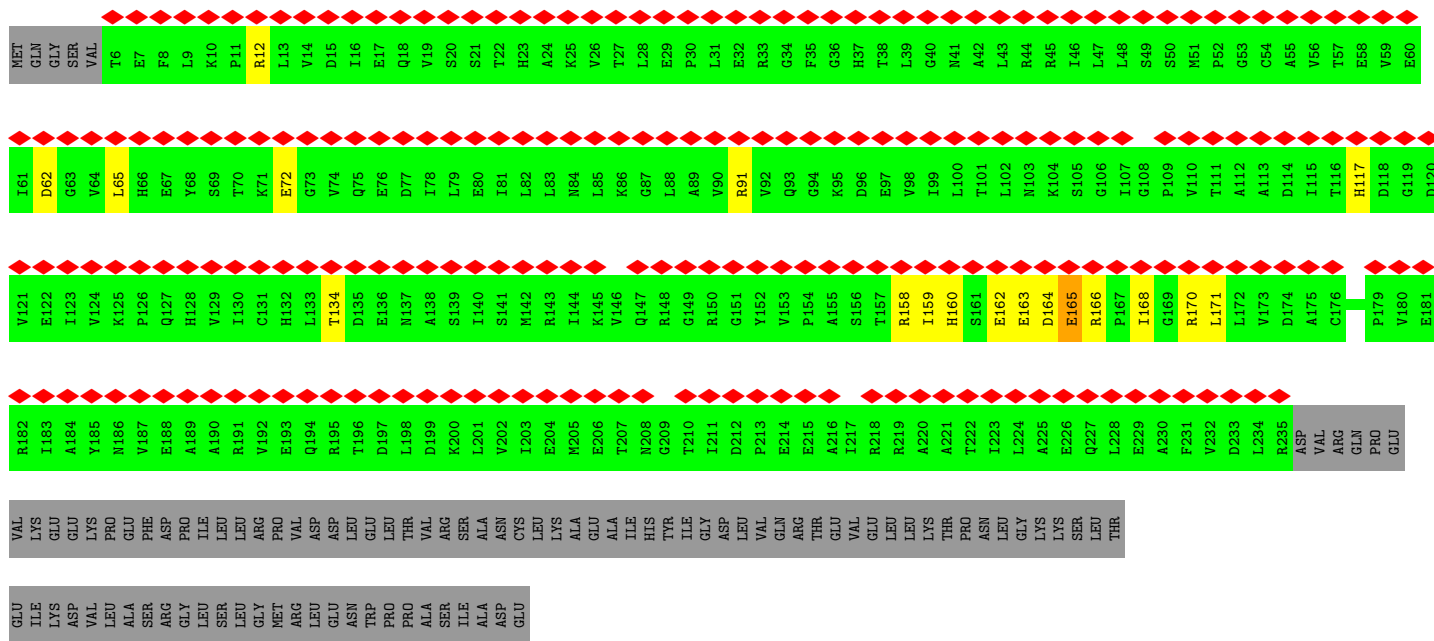
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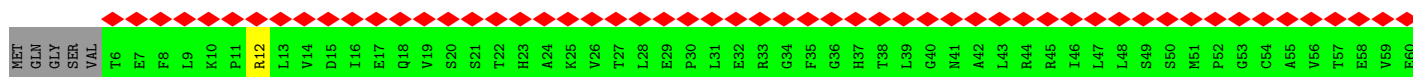
• Molecule 12: Transcription termination/antitermination protein NusG



• Molecule 13: DNA-directed RNA polymerase subunit alpha

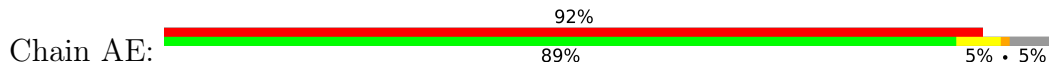


• Molecule 13: DNA-directed RNA polymerase subunit alpha



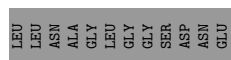
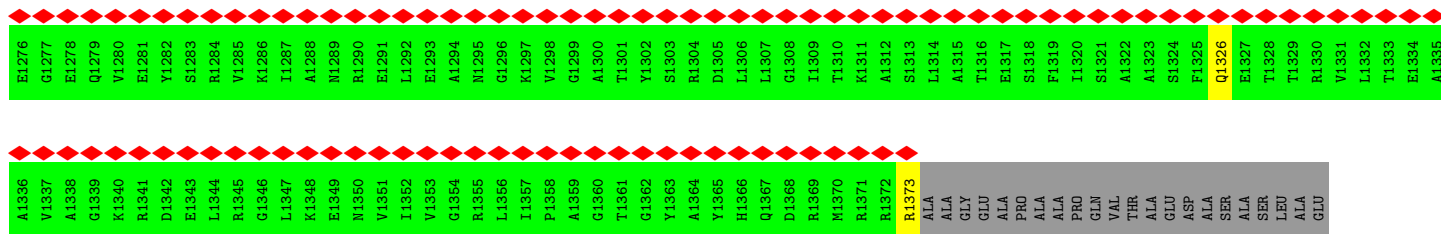
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GLU	VAL	LYS	GLU	LYS	PRO	PHE	ASP	PRO	ILE	LEU	ARG	VAL	ASP	ASP	LEU	TRP	PRO	VAL	ARG	SER	ALA	ALA	CYS	LEU	ALA	ALA	ILE	HIS	TVR	ILE	GLY	ASP	VAL	GLN	ARG	THR	VAL	LEU	LEU	LYS	THR	PRO	ASN	LEU	GLY	LYS	SER	LEU											
THR	GLU	ILE	LYS	ASP	VAL	LEU	ALA	SER	LEU	THR	MET	PRO	ARG	LEU	GLU	ASN	TRP	PRO	ALA	SER	ILE	ASP	LEU	ALA	GLU	THR	GLU	TVR	ILE	GLY	ASP	VAL	GLN	ARG	THR	VAL	LEU	LEU	LYS	THR	PRO	ASN	LEU	GLY	LYS	SER	LEU												

• Molecule 14: DNA-directed RNA polymerase subunit beta'

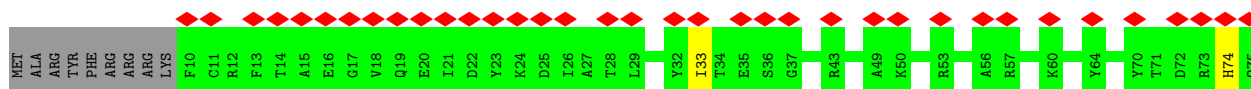
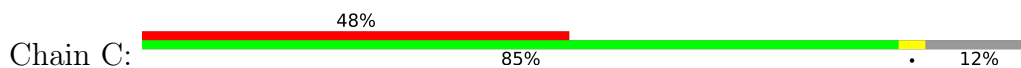


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I61	F62	G63	P64	V65	K66	D67	Y68	E69	C70	L71	C72	G73	K74	Y75	K76	R77	L78	K79	H80	R81	G82	V83	I84	C85	E86	K87	C88	G89	V90	E91	V92	T93	Q94	T95	K96	V97	R98	R99	E100	R101	M102	G103	H104	I105	E106	L107	A108	S109	P110	T111	A112	H113	I114	W115	F116	L117	K118	S119	L120
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E301	A302	V303	D304	L305	L306	L307	D308	N309	G310	R311	R312	G313	R314	A315	L316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	L327	A328	D329	N330	I331	K332	G333	K334	Q335	G336	R337	F338	R339	Q340	N341	N342	L343	G344	K345	A346	V347	V348	Y349	D350	S351	R352	S353	V354	L355	T356	V357	G358	P359	V360
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V421	L422	L423	H424	R425	A426	P427	T428	L429	H430	R431	L432	G433	L434	Q435	A436	F437	E438	P439	V440	L441	L442	E443	Q444	K445	A446	L447	Q448	L449	H450	P451	L452	C453	C454	A455	A456	Y457	N458	A459	D460	F461	G463	D464	Q465	M466	A467	V468	H469	V470	P471	L472	T473	L474	E475	A476	Q477	L478	E479	A480	

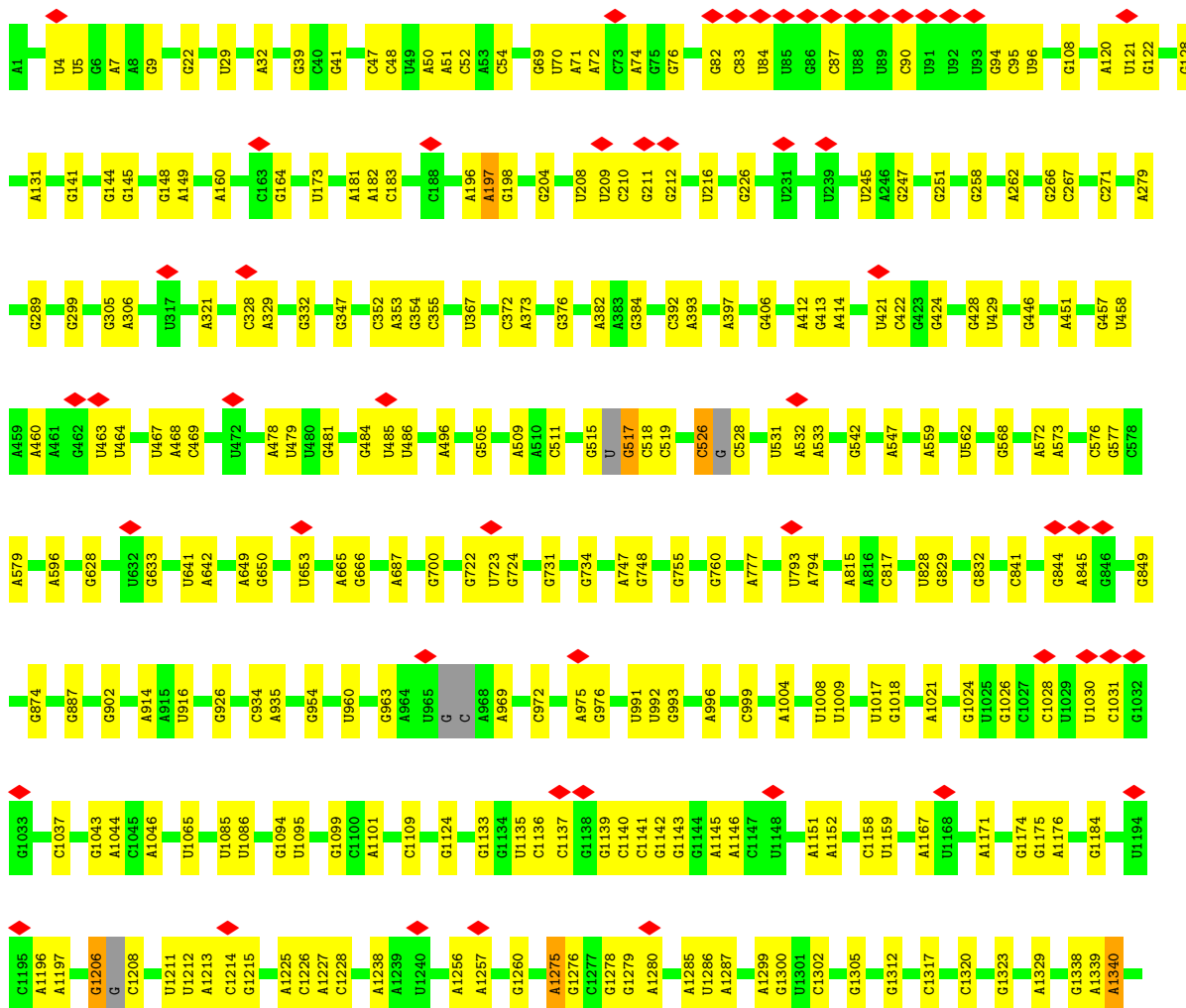
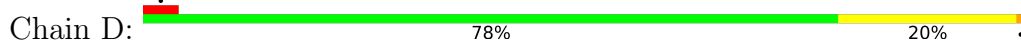
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C517	A577	A637	A637	V706	L770	G828	D891	K954	A1012	K1073	A1012	LYS	K1251	
V518	I578	S638	S638	I707	Q771	G829	F892	K955	G1013	G1074	G1013	ASP	H1252	
M519	L579	V639	V639	I708	Y772	D830	G893	G956	G1014	L1074	G1014	THR	I1253	
A520	V680	G640	G640	R709	F773	V831	V894	S957	I1015	R1075	I1015	G1136	E1254	
K521	M681	I641	I641	D710	I774	K632	C895	I959	T1016	P1076	P1139	L1137	V1255	
G522	I822	D642	D642	D710	S775	E833	A896	L960	V1017	L1078	R1140	L1138	I1256	
E523	V683	D643	D643	G711	T776	L835	V899	S961	W1020	K1079	V1141	L1139	V1257	
G524	P684	M644	M644	Q712	H777	L836	G900	I962	D1021	I1080	A1142	A1142	R1258	
M525	K685	V645	V645	E713	G778	R836	R901	V963	P1022	V1081	D1143	D1143	M1260	
V526	L686	I646	I646	E714	A779	R638	P902	K964	I1023	D1082	L1144	L1144	L1261	
L527	L687	P647	P647	K715	R780	V839	L903	S965	T1024	A1083	F1145	E1202	R1262	
T528	V688	E648	E648	V717	G782	L640	A904	V966	M1025	Q1084	E1146	R1203	K1263	
G529	Y689	K649	K649	F718	L783	L841	R905	V967	P1026	G1085	A1147	V1204	A1264	
P530	S590	H651	H651	S719	A784	G841	G906	I968	P1027	M1086	A1147	E1205	I1265	
K531	E532	E652	E652	F719	L784	R642	R907	I968	I1028	D1087	R1148	R1206	I1266	
A533	V593	I653	I653	M720	T786	V643	H907	S970	T1029	I1088	R1149	G1207	G1207	
E534	Q694	I654	I654	I722	A787	E946	I908	S971	I1028	V1088	P1151	D1208	N1268	
R535	A695	I723	I723	I722	L788	D847	I909	G971	E1030	L1089	K1151	V1209	A1269	
L536	L696	M724	M724	M724	L789	L649	I910	K972	I1031	I1090	E1152	I1210	G1270	
Y537	G597	A659	A659	M725	T790	L849	K911	L973	S1032	P1091	P1153	I1211	S1271	
R538	K598	E660	E660	I791	A791	K850	E912	I974	I1033	G1092	A1154	D1212	S1272	
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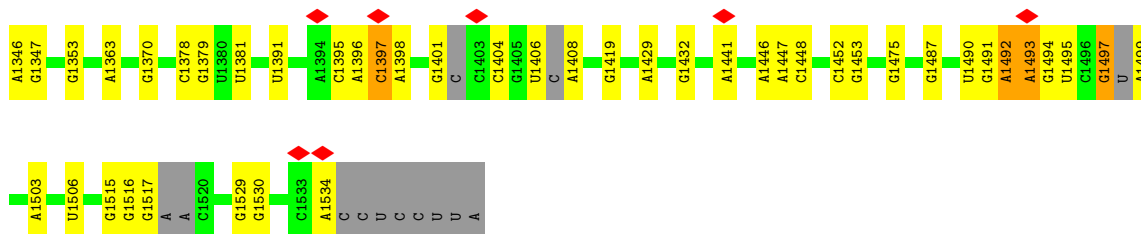


• Molecule 15: 30S ribosomal protein S18

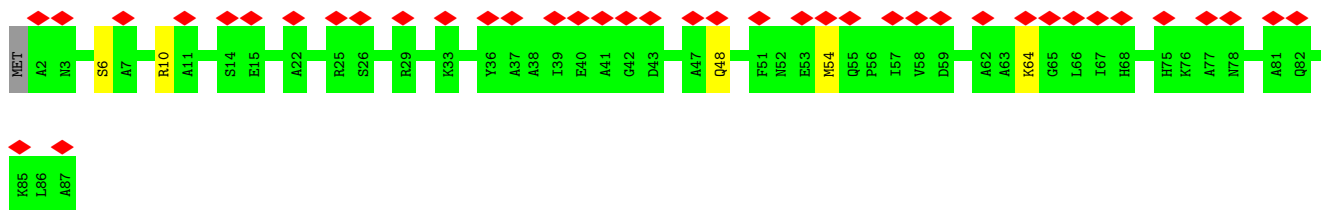
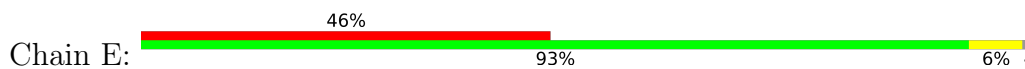


• Molecule 16: 16S rRNA

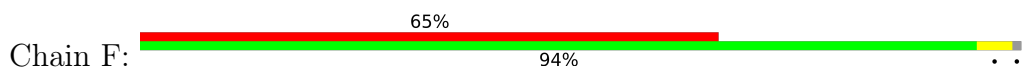




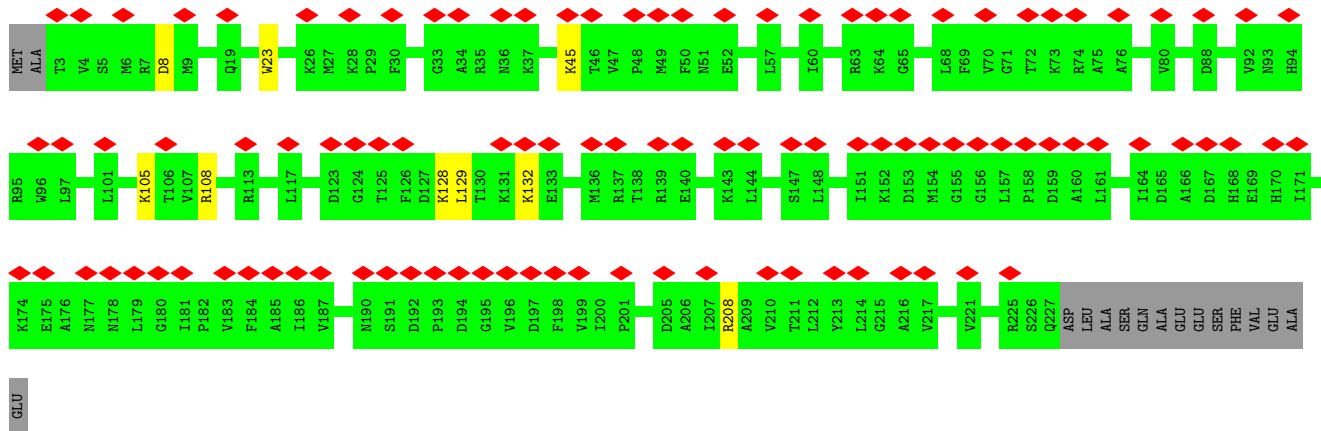
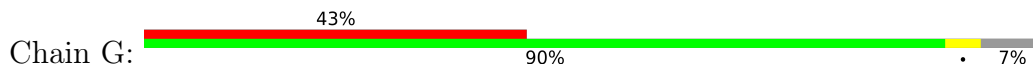
• Molecule 17: 30S ribosomal protein S20



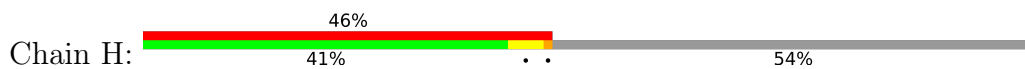
• Molecule 18: 30S ribosomal protein S21



• Molecule 19: 30S ribosomal protein S2



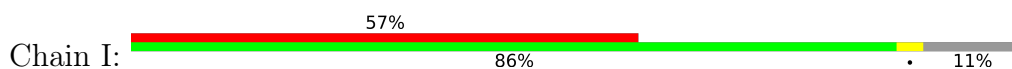
• Molecule 20: 30S ribosomal protein S1





E61	I62	Q63	V64	G65	D66	E67	D68	V70	A71	L72	D73	A74	V75	E76	D77	G78	F79	G80	E81	T82	L83	L84	S85	R86	E87	K88	A89	R91	H92	L93	E94	V95	T97	L98	E99	K100	A101	Y102	E103	D104	A105	E106	T107	V108	T109	G110	V111	I112	N113	G114	K115	V116	K117	G118	G119	F120								
T121	V122	E123	L124	N125	G126	I127	R128	A129	D69	F130	L131	P132	G133	S134	L135	V136	D137	V138	R139	P140	V141	R142	D143	T144	L145	H146	L147	E148	G149	K150	E151	L152	E153	F154	K155	V156	I157	K158	L159	D160	Q161	Y162	R163	N164	N165	V166	V167	V168	S169	R170	R171	A172	V173	I174	E175	S176	GLU	ASN	SER	ALA				
GLU	ARG	ASP	GLN	LEU	LEU	GLU	ASN	GLN	GLN	GLY	MET	GLU	VAL	VAL	GLY	ILE	VAL	LYS	ASN	THR	THR	ASP	TVP	GLY	ALA	PHE	VAL	ASP	LEU	GLY	LEU	VAL	ASP	GLY	ILE	GLY	LEU	LEU	LEU	HIS	THR	ASP	GLU	ILE	VAL	ASN	VAL	GLY	ASP	GLU	V167	V168	S169	R170	R171	A172	V173	I174	E175	S176	GLU	ASN	SER	ALA
ILE	THR	VAL	LYS	VAL	LEU	LYS	PHE	ASP	ARG	GLU	THR	ARG	VAL	VAL	GLY	LYS	GLN	LEU	GLY	E264	D265	P266	W267	V268	A269	I270	A271	K272	R273	Y274	P275	P276	E277	G277	T278	K279	L280	T281	G282	R283	V284	T285	N286	N287	L287	T288	D289	Y290	G291	C292	F293	V294	E295	I296	E297	E298	G299	V300						
E301	G302	L303	V304	R305	V306	S307	E308	R309	D310	W311	T312	R313	K314	N315	I316	R317	P318	S319	K320	V321	V322	R323	V324	G325	D326	V327	V328	E329	V330	R331	V332	L333	D334	I335	D336	E337	E338	R339	R340	R341	I342	S343	L344	G345	L346	R347	Q348	CYS	LYS	ALA	ASN	PRO	TRP	GLN	PHE	GLN	ALA	THR						
HIS	ASN	GLY	ASP	ARG	VAL	GLY	ILE	SER	ILE	THR	THR	PHE	GLY	ILE	ILE	GLY	LEU	ASP	GLY	ILE	ASP	GLY	VAL	HIS	LEU	SER	ILE	SER	TRP	ASN	VAL	ALA	GLY	GLY	GLU	ALA	VAL	ARG	VAL	TYR	LYS	LYS	ASP	GLY	ILE	ALA	VAL	VAL	VAL	VAL	LEU													
GLN	VAL	ALA	GLU	ARG	GLU	ARG	ILE	SER	VAL	GLN	LEU	ALA	GLU	ASP	PRO	PHE	ASN	LYS	TRP	VAL	ALA	VAL	ASN	LYS	GLY	ALA	VAL	ILE	THR	GLY	LYS	VAL	THR	ALA	VAL	ASP	LYS	GLY	LEU	ALA	ASP	GLY	VAL	VAL	TYR	GLN	ASP	ARG	ALA															
SER	GLU	ALA	SER	ASP	VAL	GLU	ALA	THR	VAL	LEU	SER	VAL	GLY	ASP	VAL	VAL	ALA	LYS	THR	GLU	ALA	ASP	ARG	ASN	ARG	ALA	ILE	SER	LEU	SER	VAL	ARG	ALA	VAL	ASP	LYS	GLY	ALA	ILE	THR	VAL	ASN	LYS	GLN	ASP	ALA																		
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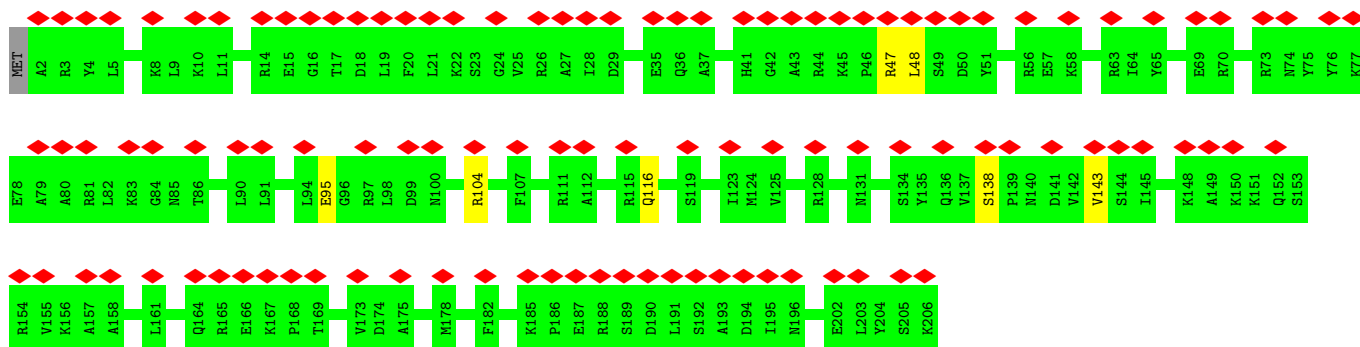
• Molecule 21: 30S ribosomal protein S3



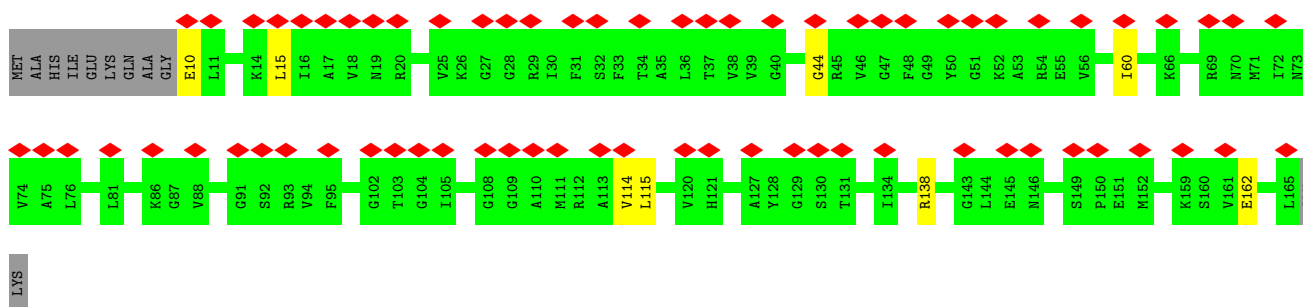
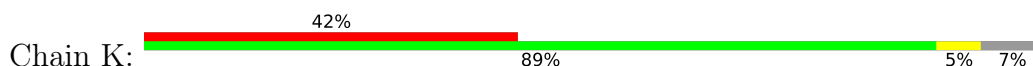
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I75	V76	I77	G78	K79	K80	G81	E82	D83	V84	L87	R88	K89	V90	V91	A92	D93	I94	A95	G96	V97	P98	E99	Q100	I101	N102	I103	A104	E105	V106	R107	K108	P109	E110	L111	D112	A113	K114	L115	V116	A117	I120	T121	L124	E125	R126	R127	F130	R131	M134	K135	R136	A137	V138	
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ALA	VAL	GLU	GLN	PRO	GLU	LYS	PRO	ALA	ALA	GLN	LYS	LYS	GLN	ARG	ARG	GLY	ARG	LYS																																				

• Molecule 22: 30S ribosomal protein S4

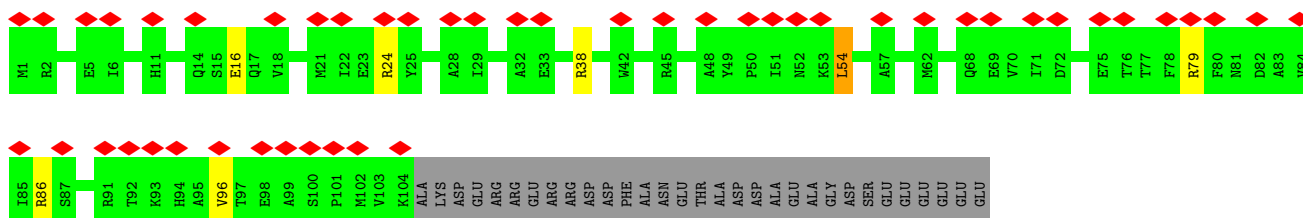




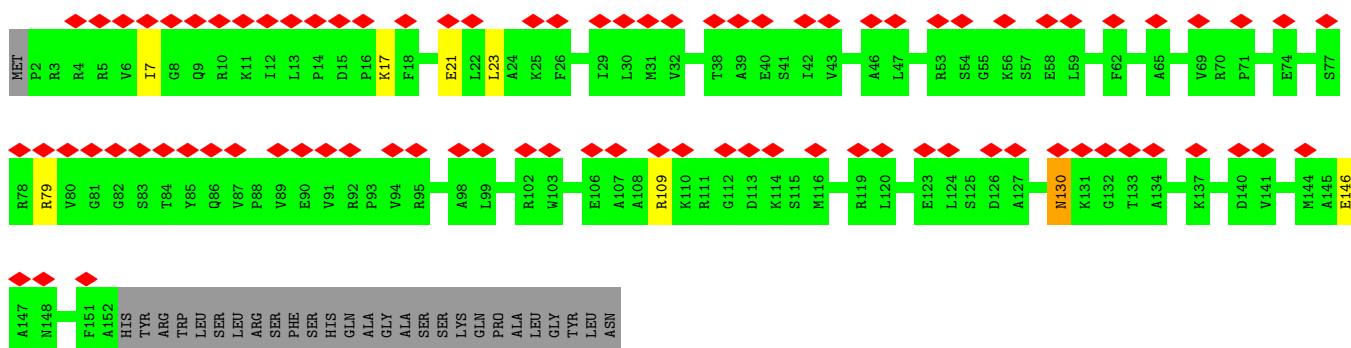
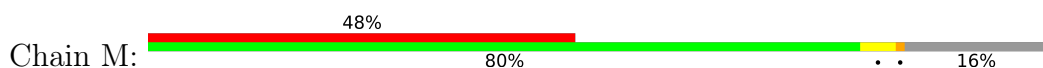
• Molecule 23: 30S ribosomal protein S5



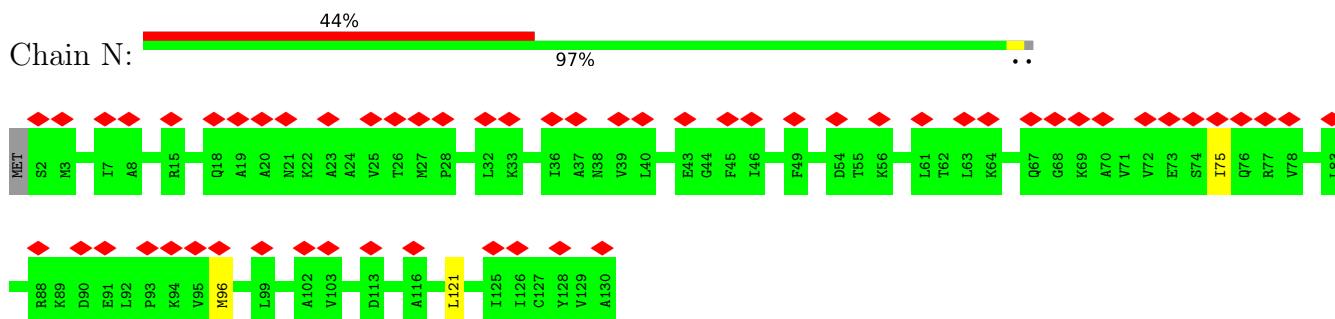
• Molecule 24: 30S ribosomal protein S6



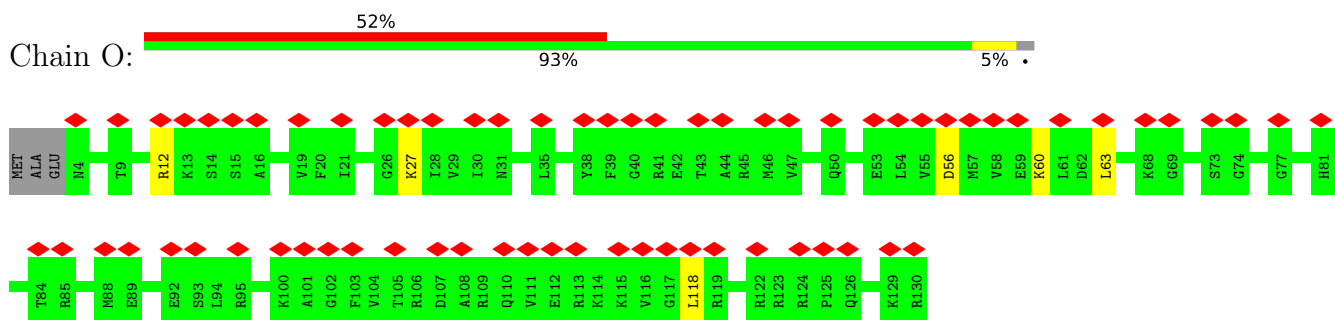
• Molecule 25: 30S ribosomal protein S7



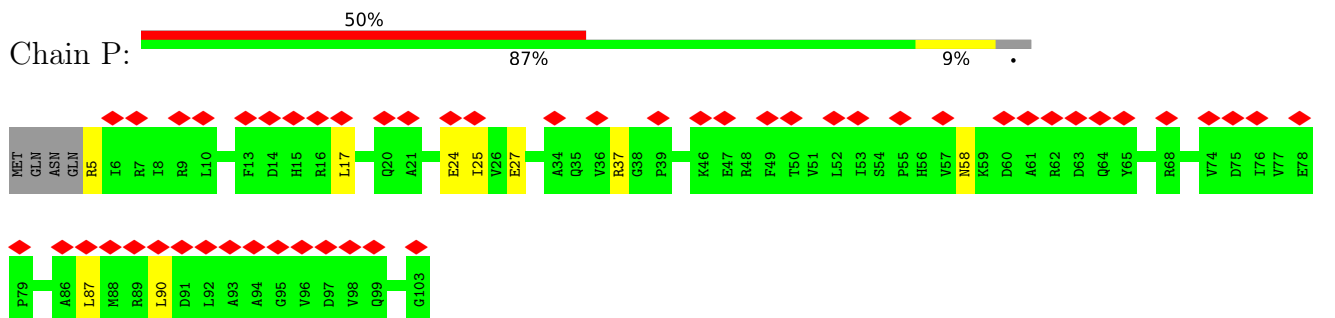
- Molecule 26: 30S ribosomal protein S8



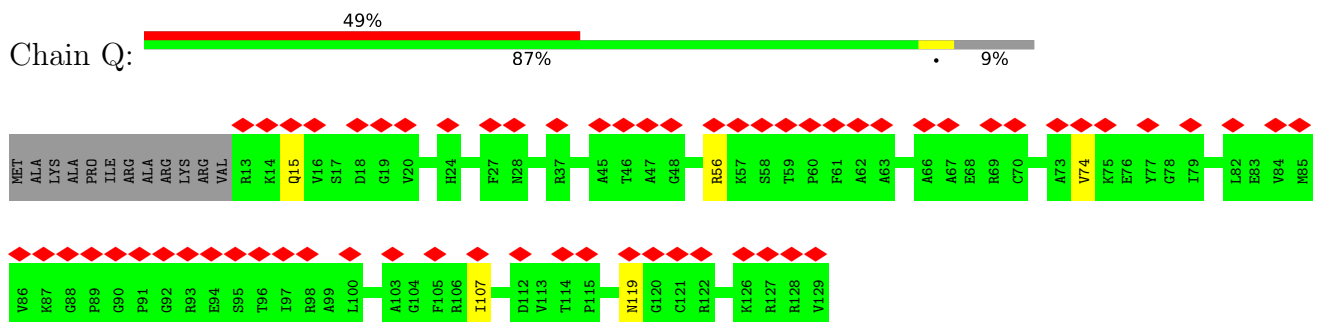
- Molecule 27: 30S ribosomal protein S9



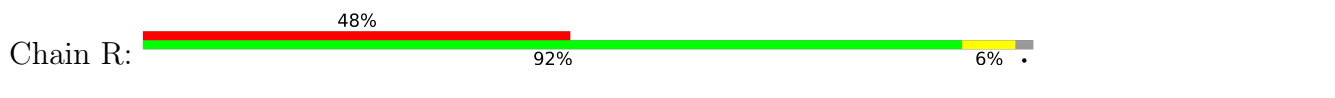
- Molecule 28: 30S ribosomal protein S10

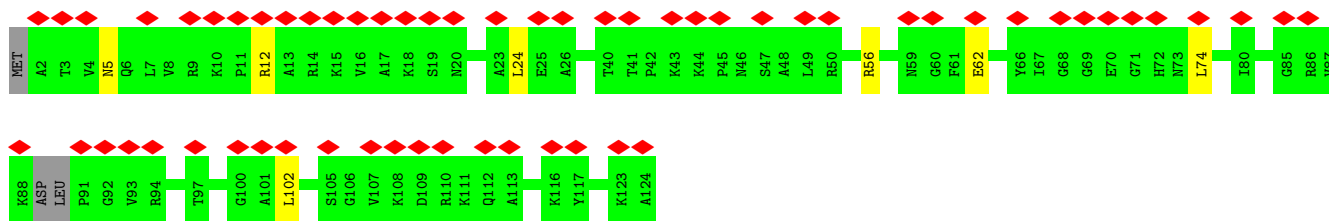


- Molecule 29: 30S ribosomal protein S11

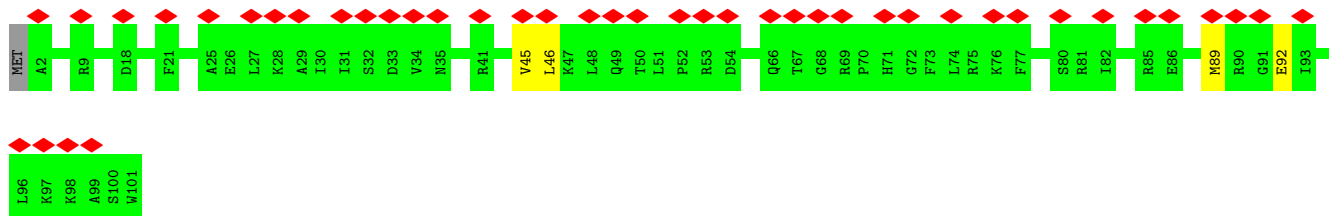
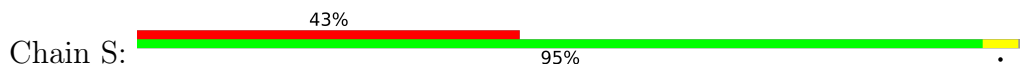


- Molecule 30: 30S ribosomal protein S12

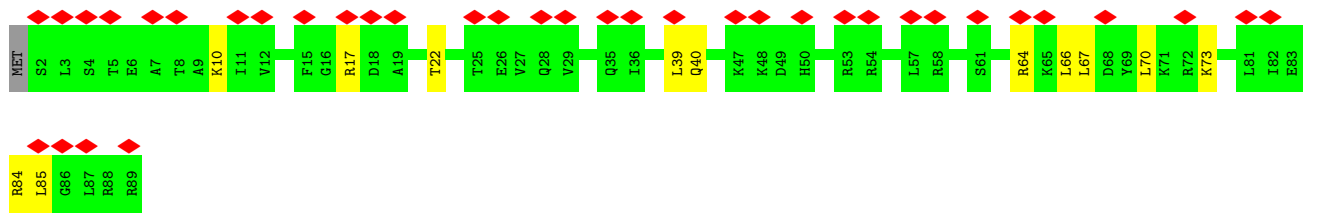
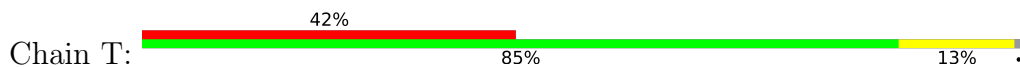




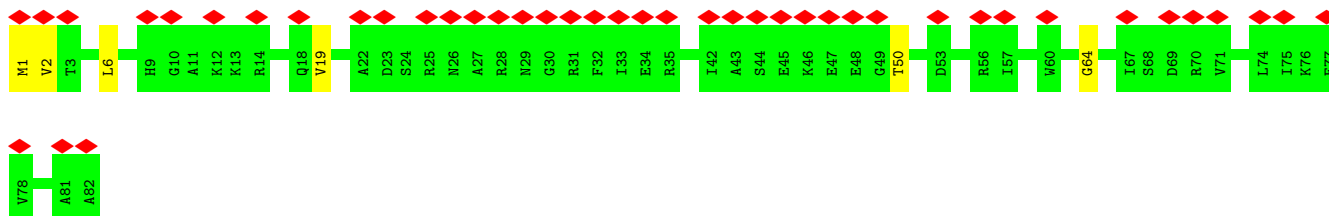
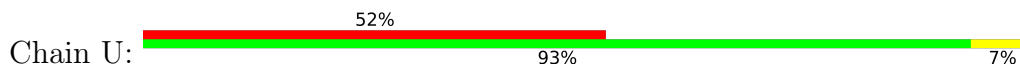
• Molecule 31: 30S ribosomal protein S14



• Molecule 32: 30S ribosomal protein S15



• Molecule 33: 30S ribosomal protein S16

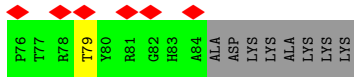
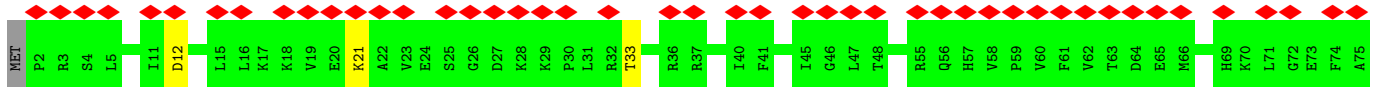
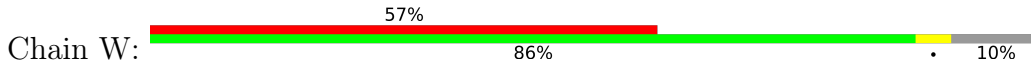


• Molecule 34: 30S ribosomal protein S17

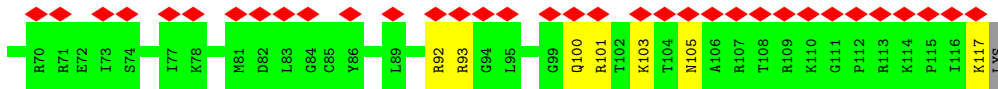
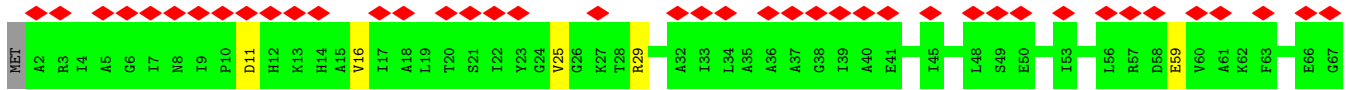
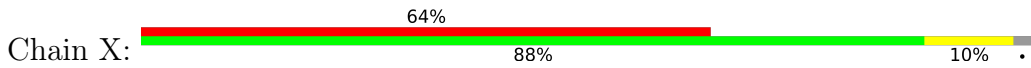




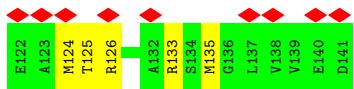
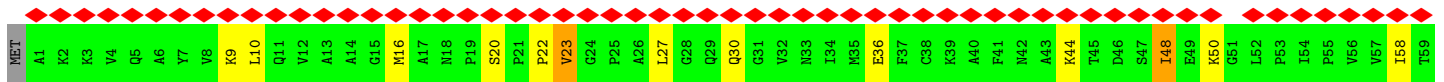
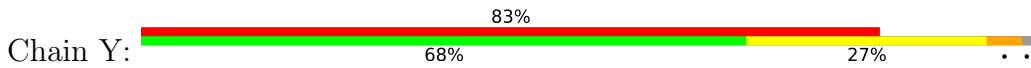
• Molecule 35: 30S ribosomal protein S19



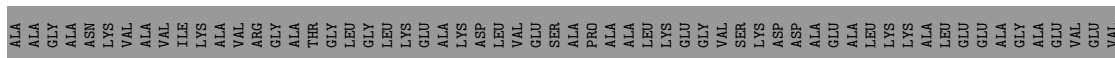
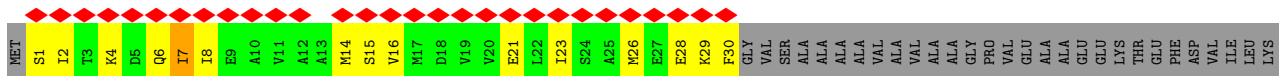
• Molecule 36: 30S ribosomal protein S13



• Molecule 37: 50S ribosomal protein L11

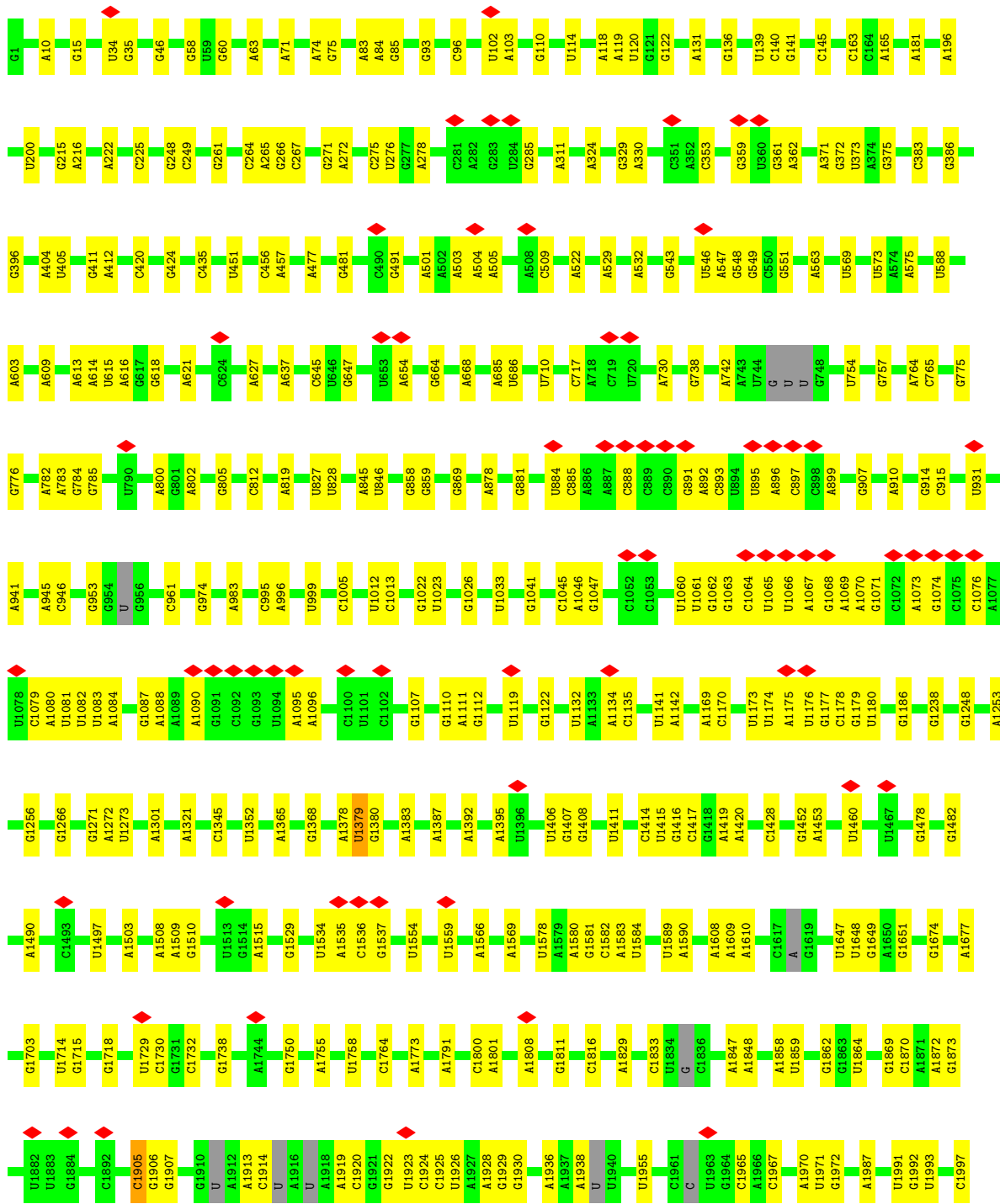
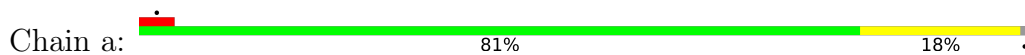


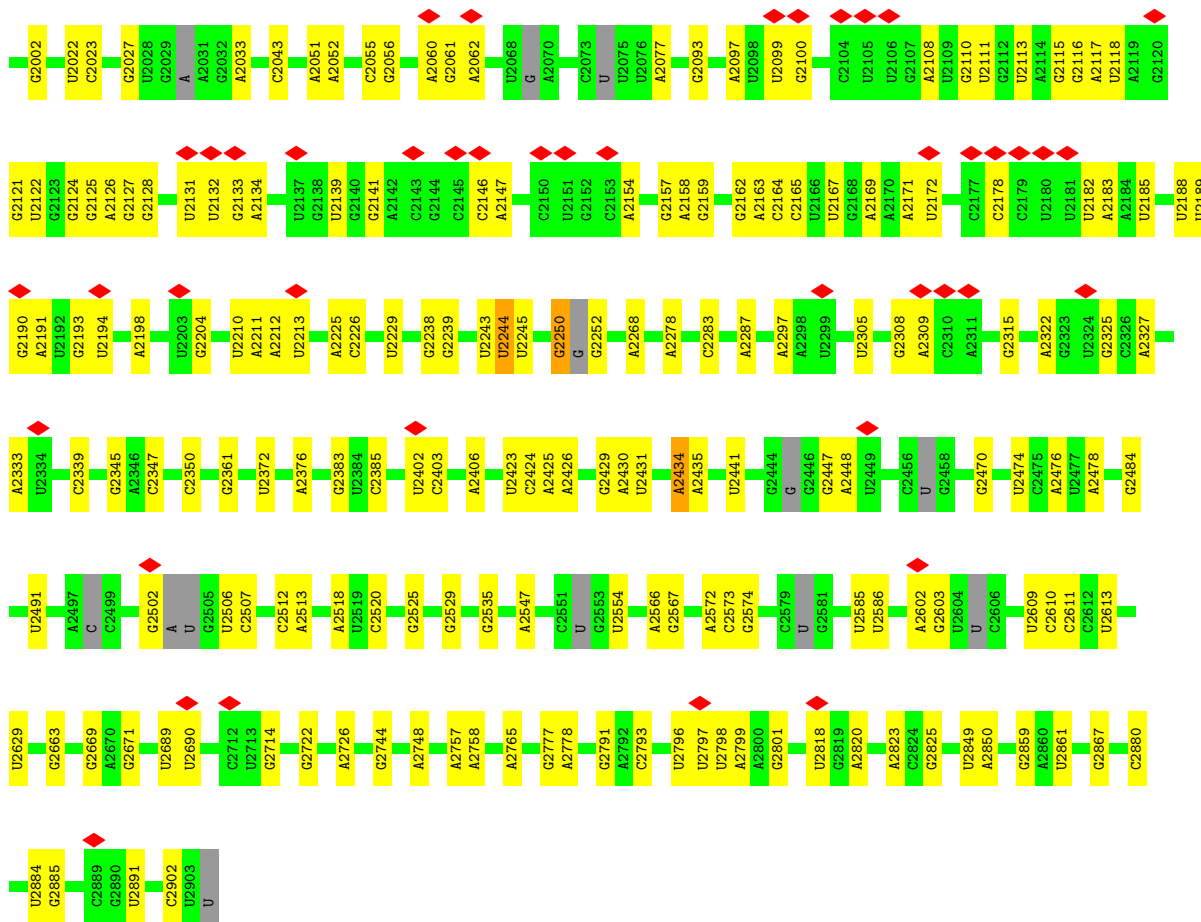
• Molecule 38: 50S ribosomal protein L7/L12



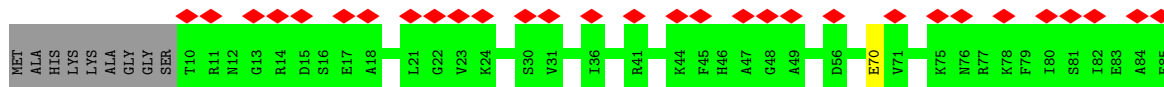
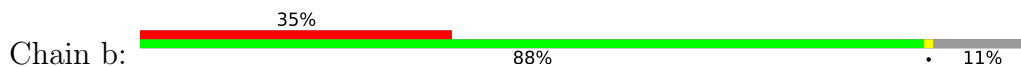
LYS

• Molecule 39: 23S rRNA

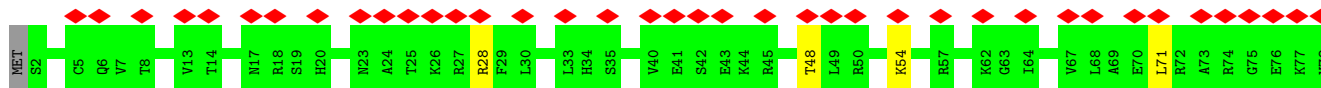
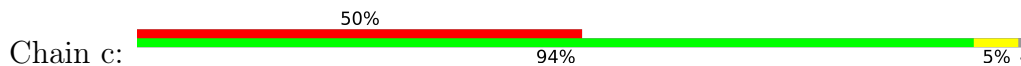




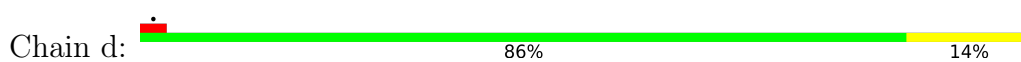
• Molecule 40: 50S ribosomal protein L27



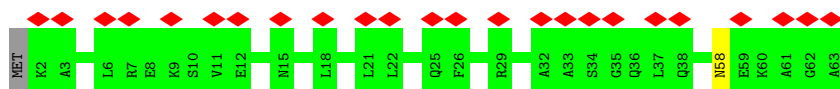
• Molecule 41: 50S ribosomal protein L28



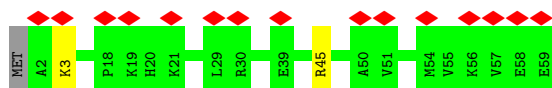
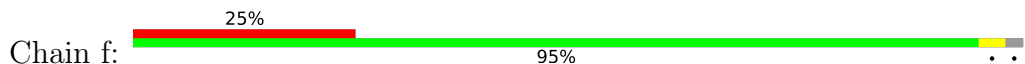
• Molecule 42: 5S rRNA



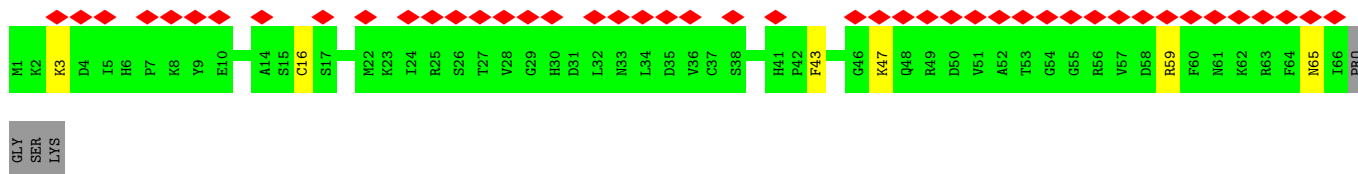
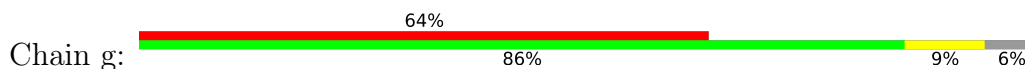
• Molecule 43: 50S ribosomal protein L29



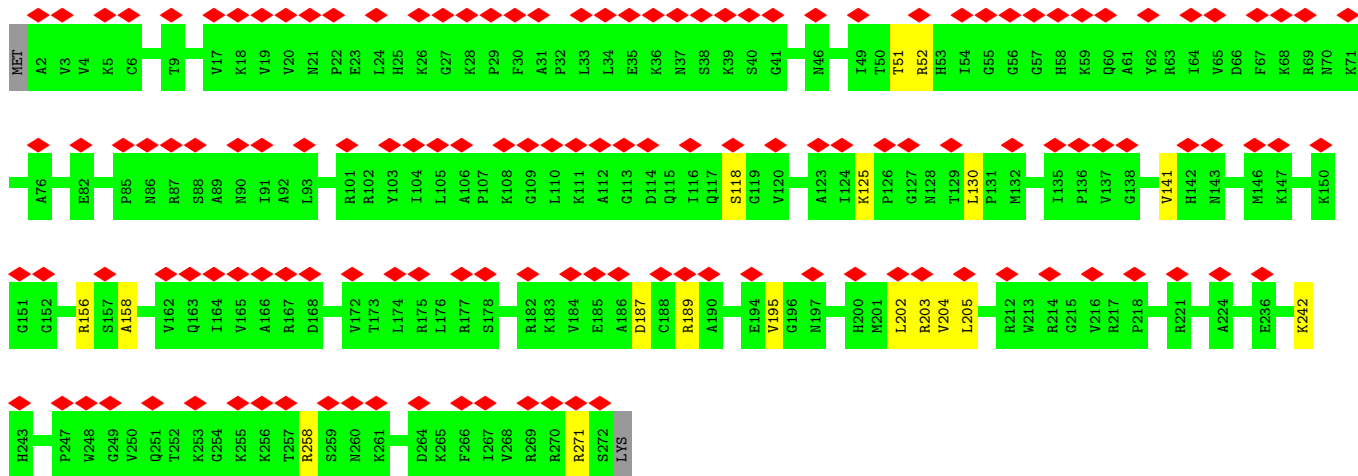
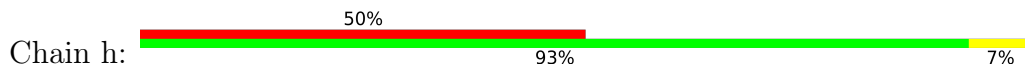
- Molecule 44: 50S ribosomal protein L30



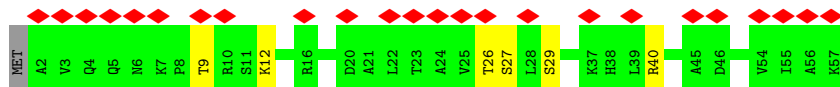
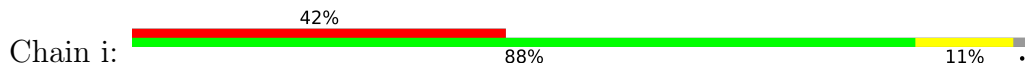
- Molecule 45: 50S ribosomal protein L31



- Molecule 46: 50S ribosomal protein L2

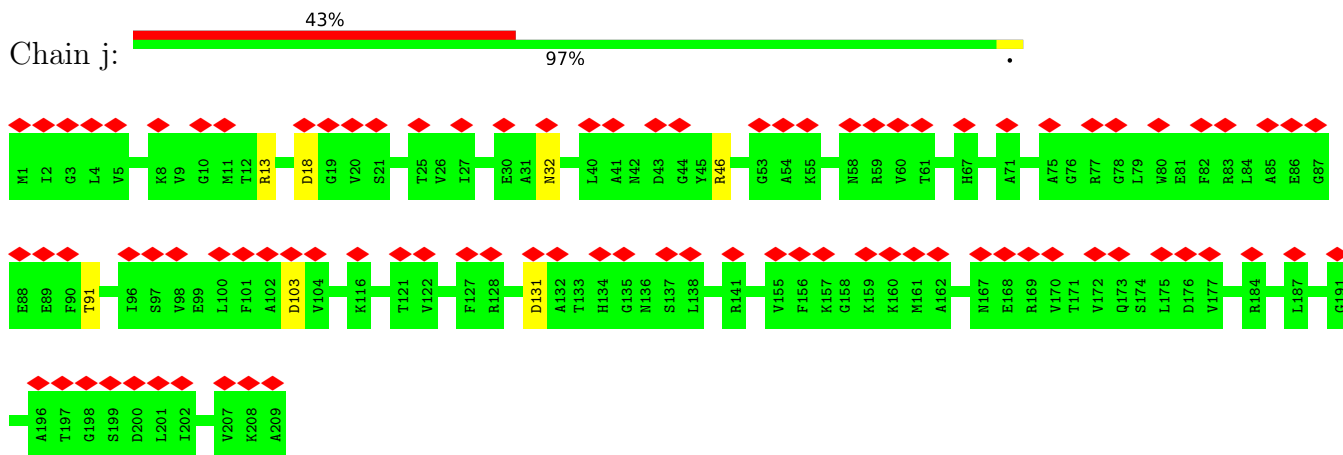


- Molecule 47: 50S ribosomal protein L32

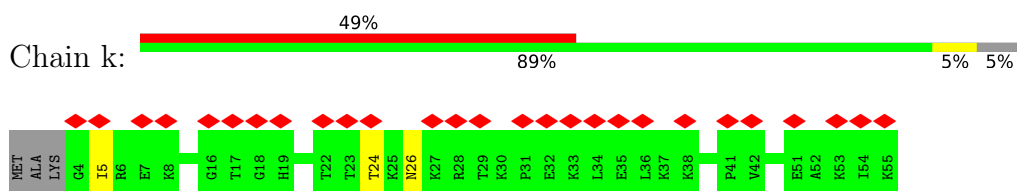


- Molecule 48: 50S ribosomal protein L3

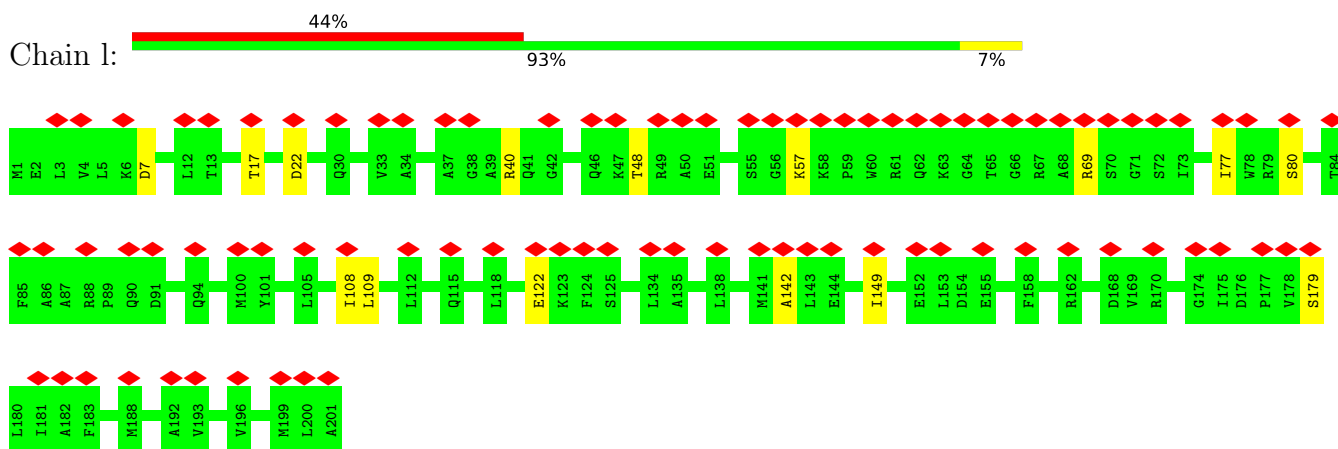




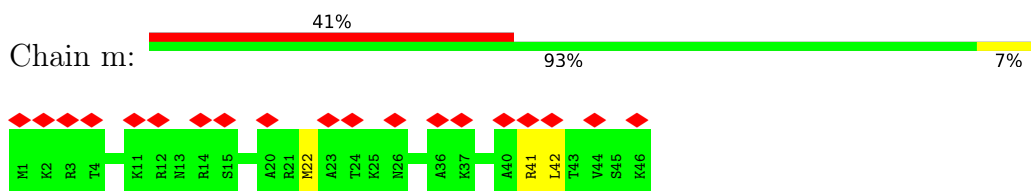
- Molecule 49: 50S ribosomal protein L33



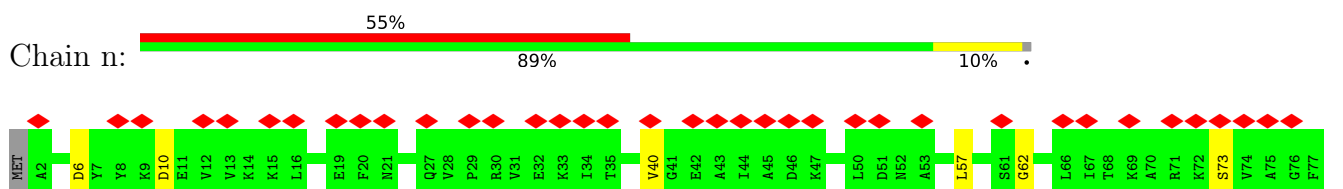
- Molecule 50: 50S ribosomal protein L4

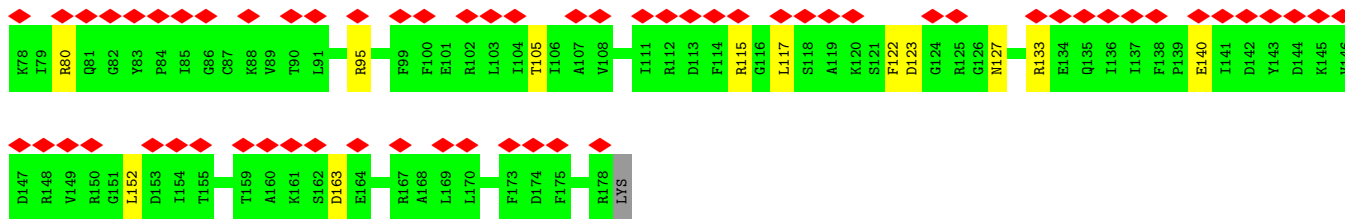


- Molecule 51: 50S ribosomal protein L34

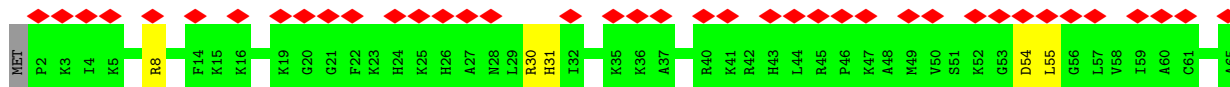
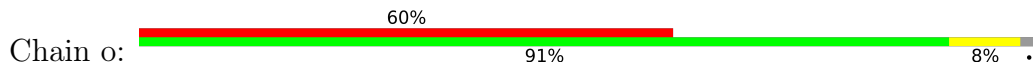


- Molecule 52: 50S ribosomal protein L5

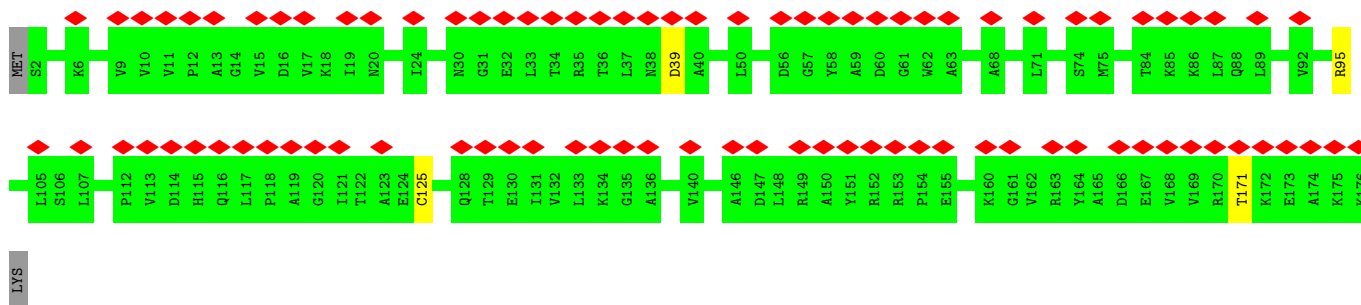




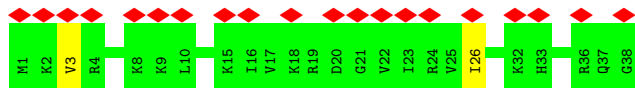
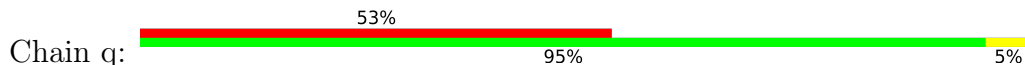
• Molecule 53: 50S ribosomal protein L35



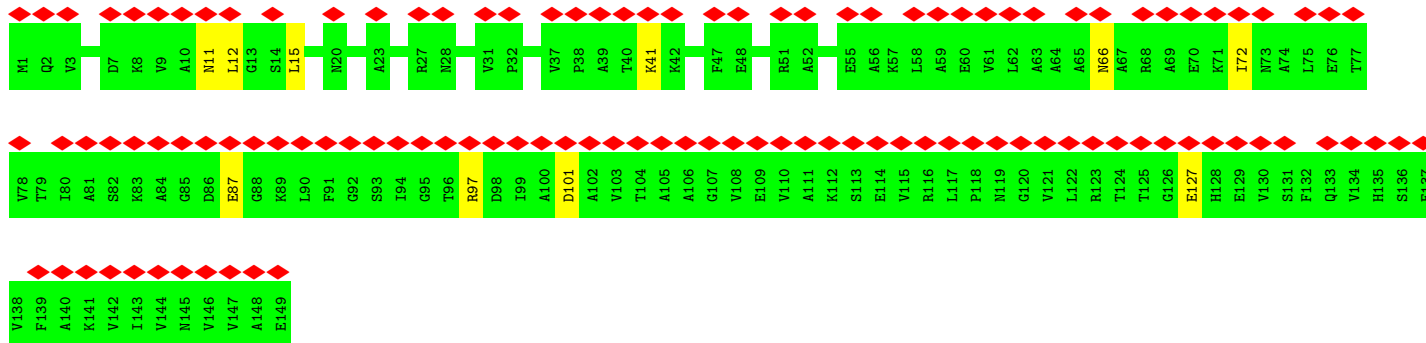
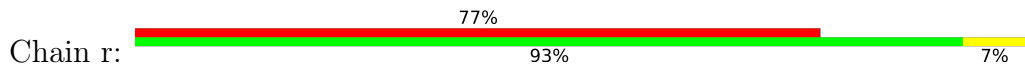
• Molecule 54: 50S ribosomal protein L6



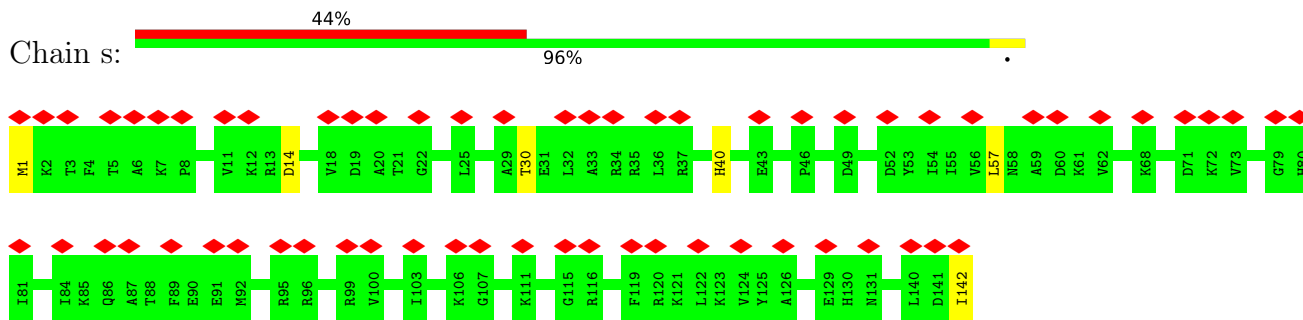
• Molecule 55: 50S ribosomal protein L36



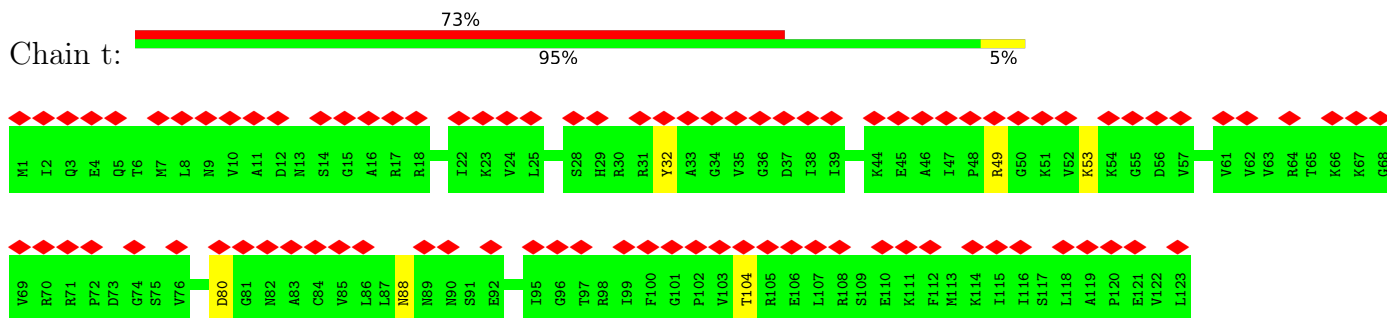
• Molecule 56: 50S ribosomal protein L9



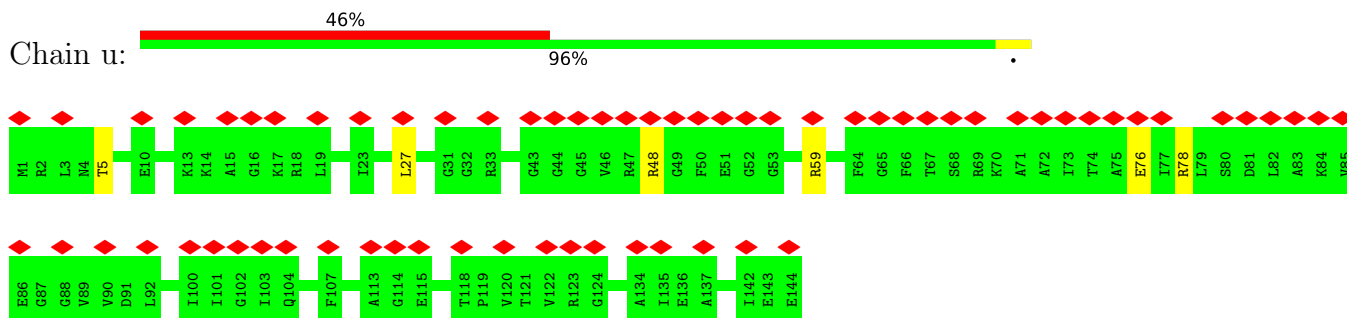
- Molecule 57: 50S ribosomal protein L13



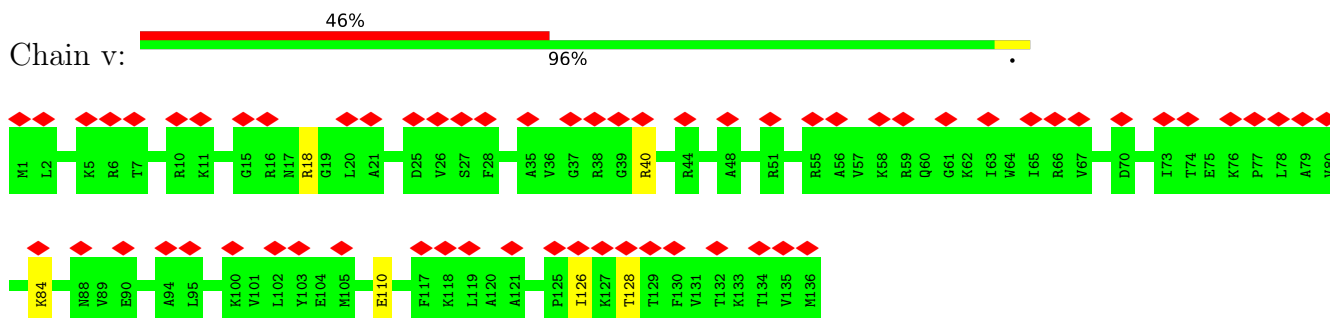
- Molecule 58: 50S ribosomal protein L14



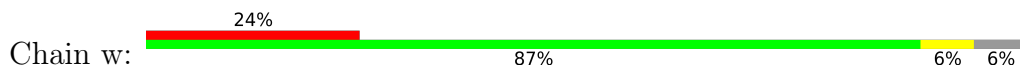
- Molecule 59: 50S ribosomal protein L15

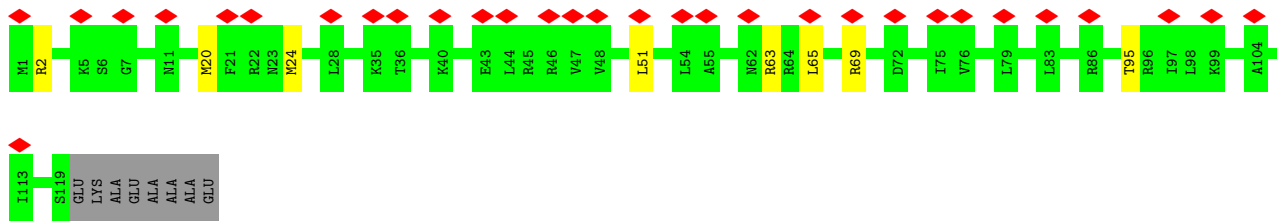


- Molecule 60: 50S ribosomal protein L16

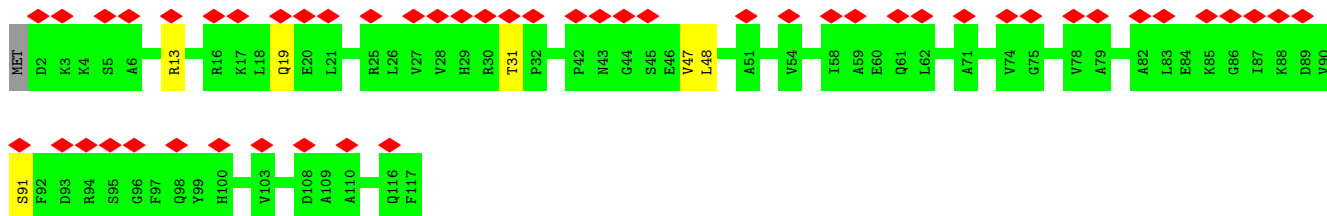
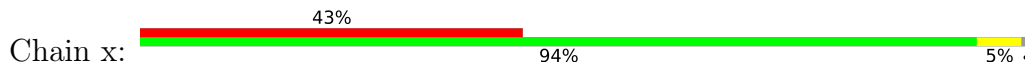


- Molecule 61: 50S ribosomal protein L17

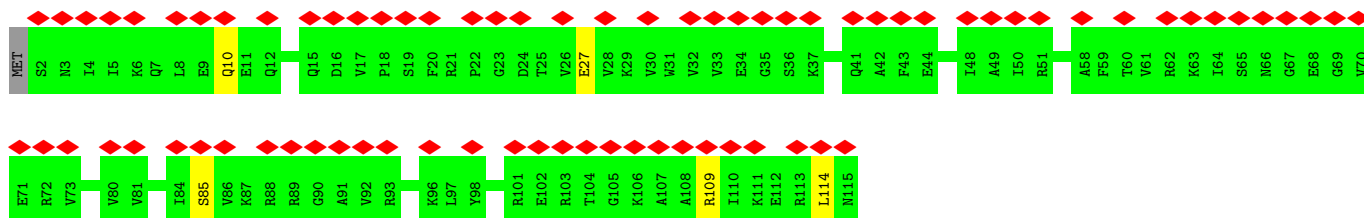




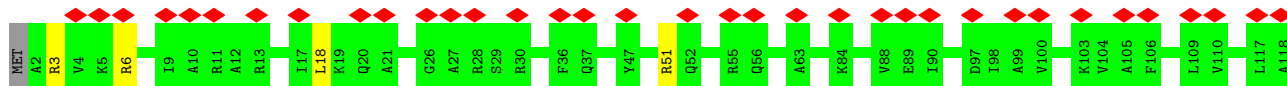
• Molecule 62: 50S ribosomal protein L18



• Molecule 63: 50S ribosomal protein L19



• Molecule 64: 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	4000	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	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	0.029	Depositor
Minimum map value	-0.014	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.009	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: MG, ZN

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	0.42	0/752	0.71	0/1005
4	3	0.35	0/796	0.67	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	1.12	4/603 (0.7%)	0.97	0/926
8	7	0.67	2/519 (0.4%)	0.99	3/804 (0.4%)
9	9	0.79	2/1131 (0.2%)	0.64	1/1524 (0.1%)
10	A	0.39	0/1810	0.75	1/2821 (0.0%)
10	B	0.46	1/1810 (0.1%)	0.86	7/2821 (0.2%)
11	AA	0.59	2/10591 (0.0%)	0.75	15/14289 (0.1%)
12	AB	0.43	0/808	0.60	0/1088
13	AC	0.48	0/1808	0.62	1/2450 (0.0%)
13	AD	0.39	0/1789	0.56	0/2425
14	AE	0.52	3/10545 (0.0%)	0.66	5/14236 (0.0%)
15	C	0.48	0/553	0.83	0/743
16	D	0.34	10/36610 (0.0%)	0.74	30/57091 (0.1%)
17	E	0.57	0/675	0.86	0/895
18	F	0.56	0/597	0.87	0/792
19	G	0.49	0/1791	0.71	0/2413
20	H	0.54	1/1746 (0.1%)	1.03	12/2382 (0.5%)
21	I	0.44	0/1663	0.71	0/2241
22	J	0.47	0/1665	0.73	0/2227
23	K	0.45	0/1165	0.75	0/1568
24	L	0.43	0/867	0.75	1/1171 (0.1%)
25	M	0.50	0/1195	0.81	0/1602
26	N	0.41	0/989	0.69	0/1326
27	O	0.43	0/1034	0.75	0/1375
28	P	0.43	0/800	0.75	0/1082
29	Q	0.40	0/893	0.70	0/1205
30	R	0.36	0/952	0.74	0/1274

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
31	S	0.49	0/817	0.78	0/1088
32	T	0.53	0/722	0.86	0/964
33	U	0.44	0/659	0.78	0/884
34	V	0.34	0/657	0.61	0/881
35	W	0.38	0/680	0.62	0/915
36	X	0.49	0/909	0.87	0/1215
37	Y	0.67	0/1046	0.58	0/1410
38	Z	0.69	0/227	0.57	0/304
39	a	0.38	3/69247 (0.0%)	0.72	18/107985 (0.0%)
40	b	0.39	0/589	0.70	0/779
41	c	0.48	0/635	0.81	1/848 (0.1%)
42	d	0.29	0/2872	0.69	0/4478
43	e	0.54	0/502	0.83	0/667
44	f	0.45	0/452	0.78	0/605
45	g	0.43	0/531	0.68	0/709
46	h	0.39	0/2121	0.78	0/2852
47	i	0.40	0/450	0.79	0/599
48	j	0.44	0/1586	0.69	0/2134
49	k	0.35	0/433	0.65	0/576
50	l	0.46	0/1571	0.77	0/2113
51	m	0.53	0/380	0.99	0/498
52	n	0.49	0/1434	0.88	3/1926 (0.2%)
53	o	0.46	0/513	0.83	0/676
54	p	0.39	0/1333	0.67	0/1805
55	q	0.37	0/303	0.77	0/397
56	r	0.43	0/1122	0.69	0/1515
57	s	0.50	0/1152	0.75	0/1551
58	t	0.41	0/955	0.78	0/1279
59	u	0.40	0/1062	0.76	0/1413
60	v	0.47	0/1093	0.82	0/1460
61	w	0.52	0/964	0.87	0/1289
62	x	0.46	0/902	0.81	0/1209
63	y	0.41	0/929	0.73	1/1242 (0.1%)
64	z	0.60	0/960	0.91	1/1278 (0.1%)
All	All	0.43	34/188952 (0.0%)	0.74	103/278480 (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
14	AE	0	5
20	H	0	3
36	X	0	1
All	All	0	23

All (34) 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
16	D	1516	G	O3'-P	-13.37	1.45	1.61
16	D	1339	A	O3'-P	10.52	1.73	1.61
11	AA	374	GLU	C-N	10.46	1.54	1.34
14	AE	88	CYS	CB-SG	-10.17	1.65	1.82
6	5	109	DT	O3'-P	8.66	1.71	1.61
16	D	145	G	O3'-P	8.44	1.71	1.61
7	6	10	DG	C1'-N9	-8.29	1.35	1.47
16	D	196	A	O3'-P	8.29	1.71	1.61
11	AA	850	ILE	N-CA	-8.21	1.29	1.46
16	D	1275	A	O3'-P	7.76	1.70	1.61
39	a	2434	A	O3'-P	7.59	1.70	1.61
20	H	169	SER	N-CA	7.52	1.61	1.46
16	D	1515	G	O3'-P	-7.30	1.52	1.61
6	5	121	DG	C1'-N9	-7.24	1.37	1.47
8	7	19	G	C1'-N9	-7.17	1.36	1.46
16	D	1395	C	O3'-P	7.16	1.69	1.61
16	D	1490	U	O3'-P	6.83	1.69	1.61
8	7	-19	U	C1'-N1	6.82	1.58	1.48
6	5	112	DG	C1'-N9	-6.73	1.37	1.47
16	D	1492	A	O3'-P	6.60	1.69	1.61
39	a	1905	C	O3'-P	6.59	1.69	1.61
39	a	2167	U	O3'-P	6.55	1.69	1.61
6	5	100	DA	C1'-N9	-6.53	1.38	1.47
7	6	21	DA	C1'-N9	-6.42	1.38	1.47
14	AE	93	THR	CA-C	6.22	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	-5.96	1.39	1.47
14	AE	70	CYS	CA-CB	-5.82	1.41	1.53
7	6	28	DA	C1'-N9	-5.73	1.39	1.47
10	B	36	U	O3'-P	5.70	1.68	1.61

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	D	1397	C	O3'-P	5.65	1.68	1.61
7	6	24	DT	C1'-N1	5.28	1.56	1.49

All (103) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	D	1516	G	P-O3'-C3'	-19.03	96.86	119.70
16	D	1516	G	O3'-P-O5'	13.79	130.21	104.00
11	AA	1250	SER	C-N-CA	11.14	149.55	121.70
39	a	2252	G	N9-C1'-C2'	-10.95	99.76	114.00
16	D	1401	G	N9-C1'-C2'	-10.70	100.09	114.00
52	n	73	SER	N-CA-CB	-10.63	94.56	110.50
16	D	1499	A	N9-C1'-C2'	-10.29	100.62	114.00
16	D	528	C	N1-C1'-C2'	-10.21	100.72	114.00
20	H	169	SER	N-CA-C	9.96	137.91	111.00
16	D	1339	A	P-O3'-C3'	9.89	131.57	119.70
10	B	29	G	N9-C1'-C2'	-9.75	101.28	112.00
10	B	28	C	P-O3'-C3'	9.62	131.24	119.70
14	AE	271	ARG	NE-CZ-NH2	-9.38	115.61	120.30
16	D	196	A	P-O3'-C3'	9.37	130.94	119.70
11	AA	375	PRO	CA-N-CD	-9.26	98.53	111.50
16	D	526	C	N1-C1'-C2'	-8.79	102.33	112.00
20	H	88	LYS	C-N-CA	8.75	143.57	121.70
39	a	2167	U	P-O3'-C3'	8.58	129.99	119.70
16	D	1208	C	N1-C1'-C2'	-8.54	102.60	112.00
16	D	1206	G	N9-C1'-C2'	-8.41	102.75	112.00
11	AA	995	ASP	O-C-N	-8.24	109.51	122.70
9	9	130	PRO	CA-N-CD	-8.23	99.97	111.50
39	a	2434	A	P-O3'-C3'	8.21	129.55	119.70
11	AA	376	PRO	N-CA-CB	-8.05	93.64	103.30
16	D	1406	U	N1-C1'-C2'	-7.79	103.43	112.00
39	a	1905	C	P-O3'-C3'	7.66	128.89	119.70
16	D	1275	A	P-O3'-C3'	7.61	128.83	119.70
16	D	1490	U	P-O3'-C3'	7.53	128.73	119.70
16	D	1492	A	P-O3'-C3'	7.53	128.73	119.70
20	H	305	HIS	N-CA-C	7.42	131.04	111.00
10	B	29	G	C3'-C2'-O2'	7.36	134.63	113.30
8	7	-20	A	OP2-P-O3'	7.18	121.00	105.20
16	D	1206	G	C4'-C3'-O3'	7.16	127.32	113.00
16	D	1493	A	C2'-C3'-O3'	7.11	125.14	109.50
10	B	35	A	P-O3'-C3'	7.11	128.23	119.70
39	a	2245	U	N1-C1'-C2'	-7.07	104.22	112.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	D	145	G	P-O3'-C3'	7.06	128.17	119.70
16	D	1516	G	OP1-P-O3'	-7.00	89.80	105.20
16	D	1395	C	P-O3'-C3'	6.95	128.04	119.70
11	AA	855	PRO	N-CA-CB	-6.85	95.07	102.60
8	7	-20	A	O3'-P-O5'	-6.81	91.06	104.00
52	n	73	SER	CB-CA-C	6.72	122.88	110.10
11	AA	995	ASP	CA-C-N	6.71	131.97	117.20
16	D	1515	G	O3'-P-O5'	-6.69	91.30	104.00
16	D	1401	G	C4'-C3'-O3'	6.62	126.23	113.00
39	a	2250	G	C4'-C3'-O3'	-6.60	95.54	109.40
39	a	1379	U	C2'-C3'-O3'	6.57	124.21	113.70
39	a	2243	U	N1-C1'-C2'	-6.56	104.78	112.00
16	D	1515	G	P-O3'-C3'	6.52	127.52	119.70
20	H	339	ARG	C-N-CA	6.49	137.91	121.70
11	AA	935	THR	CA-CB-OG1	-6.47	95.42	109.00
16	D	1408	A	N9-C1'-C2'	-6.41	104.95	112.00
16	D	515	G	N9-C1'-C2'	-6.41	104.95	112.00
16	D	1497	G	N9-C1'-C2'	-6.40	104.96	112.00
10	B	34	C	P-O3'-C3'	6.38	127.36	119.70
6	5	109	DT	P-O3'-C3'	6.33	127.30	119.70
13	AC	117	HIS	CB-CA-C	-6.22	97.97	110.40
11	AA	849	GLU	C-N-CA	6.12	137.01	121.70
11	AA	1004	ASP	CB-CA-C	5.98	122.37	110.40
20	H	140	PRO	N-CA-CB	5.97	110.47	103.30
11	AA	943	LYS	CA-C-O	-5.94	107.62	120.10
20	H	330	VAL	N-CA-C	5.92	126.97	111.00
10	B	29	G	P-O3'-C3'	5.90	126.78	119.70
20	H	336	ASP	CB-CA-C	-5.89	98.63	110.40
11	AA	727	VAL	N-CA-C	-5.88	95.11	111.00
39	a	754	U	N1-C1'-C2'	5.87	121.64	114.00
11	AA	943	LYS	CA-C-N	5.86	130.09	117.20
20	H	132	PRO	N-CA-CB	5.80	110.26	103.30
20	H	168	VAL	C-N-CA	5.80	136.19	121.70
14	AE	903	LEU	C-N-CA	5.76	136.11	121.70
16	D	517	G	C5'-C4'-C3'	5.73	125.17	116.00
20	H	344	LEU	CA-CB-CG	5.68	128.35	115.30
52	n	127	ASN	CB-CA-C	5.64	121.68	110.40
39	a	2244	U	C1'-C2'-O2'	-5.63	93.72	110.60
24	L	54	LEU	CA-CB-CG	5.59	128.16	115.30
14	AE	363	LEU	CA-CB-CG	5.58	128.13	115.30
11	AA	1233	LEU	CA-CB-CG	5.46	127.86	115.30
39	a	783	A	C4'-C3'-O3'	5.44	123.89	113.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
41	c	28	ARG	NE-CZ-NH2	-5.38	117.61	120.30
4	3	22	ARG	NE-CZ-NH1	5.37	122.99	120.30
16	D	1397	C	P-O3'-C3'	5.35	126.12	119.70
63	y	109	ARG	NE-CZ-NH2	5.33	122.97	120.30
16	D	1340	A	C5'-C4'-C3'	5.30	124.49	116.00
11	AA	728	ASP	N-CA-C	5.27	125.23	111.00
4	3	22	ARG	NE-CZ-NH2	-5.25	117.67	120.30
39	a	742	A	C8-N9-C1'	-5.21	118.32	127.70
16	D	1340	A	C5'-C4'-O4'	5.20	115.34	109.10
39	a	404	A	C2'-C3'-O3'	5.19	122.00	113.70
20	H	169	SER	N-CA-CB	-5.17	102.74	110.50
11	AA	817	LEU	CB-CG-CD2	-5.15	102.24	111.00
39	a	2244	U	C4'-C3'-O3'	5.15	123.30	113.00
39	a	742	A	C4-N9-C1'	5.11	135.50	126.30
8	7	-17	U	C2'-C3'-O3'	5.10	121.86	113.70
39	a	2252	G	C4'-C3'-O3'	5.09	123.19	113.00
64	z	6	ARG	NE-CZ-NH2	5.09	122.84	120.30
16	D	197	A	C2'-C3'-O3'	5.09	121.84	113.70
10	B	48	C	N1-C1'-C2'	5.08	120.61	114.00
10	A	48	C	N1-C1'-C2'	5.06	120.58	114.00
14	AE	807	LEU	CB-CG-CD2	-5.06	102.40	111.00
39	a	1141	U	N1-C1'-C2'	5.04	120.56	114.00
14	AE	73	GLY	N-CA-C	5.04	125.69	113.10
39	a	2243	U	C4'-C3'-O3'	5.02	123.04	113.00
20	H	153	GLU	N-CA-C	-5.01	97.47	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
11	AA	853	ASP	Mainchain

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Mol	Chain	Res	Type	Group
14	AE	1184	ASP	Peptide
14	AE	1326	GLN	Peptide
14	AE	313	GLY	Peptide
14	AE	416	ILE	Peptide
14	AE	804	ALA	Peptide
10	B	19	G	Sidechain
10	B	7	G	Sidechain
20	H	274	TYR	Peptide
20	H	81	GLU	Peptide
20	H	82	THR	Peptide
36	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%)	15	55
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%)	15	55
5	4	92/94 (98%)	91 (99%)	1 (1%)	0	100	100
9	9	146/165 (88%)	95 (65%)	37 (25%)	14 (10%)	0	10
11	AA	1318/1342 (98%)	1149 (87%)	137 (10%)	32 (2%)	6	33
12	AB	94/181 (52%)	88 (94%)	6 (6%)	0	100	100
13	AC	228/329 (69%)	215 (94%)	11 (5%)	2 (1%)	17	57
13	AD	226/329 (69%)	213 (94%)	12 (5%)	1 (0%)	34	72

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
14	AE	1329/1407 (94%)	1200 (90%)	120 (9%)	9 (1%)	22	63
15	C	64/75 (85%)	63 (98%)	1 (2%)	0	100	100
17	E	84/87 (97%)	83 (99%)	1 (1%)	0	100	100
18	F	68/71 (96%)	68 (100%)	0	0	100	100
19	G	223/241 (92%)	210 (94%)	13 (6%)	0	100	100
20	H	255/557 (46%)	188 (74%)	55 (22%)	12 (5%)	2	21
21	I	206/233 (88%)	196 (95%)	9 (4%)	1 (0%)	29	69
22	J	203/206 (98%)	198 (98%)	5 (2%)	0	100	100
23	K	154/167 (92%)	146 (95%)	7 (4%)	1 (1%)	25	66
24	L	102/135 (76%)	97 (95%)	4 (4%)	1 (1%)	15	55
25	M	149/179 (83%)	144 (97%)	4 (3%)	1 (1%)	22	63
26	N	127/130 (98%)	121 (95%)	5 (4%)	1 (1%)	19	60
27	O	125/130 (96%)	115 (92%)	9 (7%)	1 (1%)	19	60
28	P	97/103 (94%)	88 (91%)	8 (8%)	1 (1%)	15	55
29	Q	115/129 (89%)	104 (90%)	9 (8%)	2 (2%)	9	42
30	R	117/124 (94%)	116 (99%)	1 (1%)	0	100	100
31	S	98/101 (97%)	97 (99%)	1 (1%)	0	100	100
32	T	86/89 (97%)	82 (95%)	4 (5%)	0	100	100
33	U	80/82 (98%)	75 (94%)	4 (5%)	1 (1%)	12	48
34	V	78/84 (93%)	74 (95%)	4 (5%)	0	100	100
35	W	81/92 (88%)	78 (96%)	3 (4%)	0	100	100
36	X	114/118 (97%)	107 (94%)	5 (4%)	2 (2%)	8	40
37	Y	139/142 (98%)	102 (73%)	25 (18%)	12 (9%)	1	12
38	Z	28/121 (23%)	19 (68%)	7 (25%)	2 (7%)	1	14
40	b	74/85 (87%)	69 (93%)	5 (7%)	0	100	100
41	c	75/78 (96%)	72 (96%)	3 (4%)	0	100	100
43	e	60/63 (95%)	57 (95%)	3 (5%)	0	100	100
44	f	56/59 (95%)	53 (95%)	3 (5%)	0	100	100
45	g	64/70 (91%)	63 (98%)	1 (2%)	0	100	100
46	h	269/273 (98%)	259 (96%)	9 (3%)	1 (0%)	34	72
47	i	54/57 (95%)	51 (94%)	3 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
48	j	207/209 (99%)	198 (96%)	9 (4%)	0	100	100
49	k	50/55 (91%)	50 (100%)	0	0	100	100
50	l	199/201 (99%)	190 (96%)	8 (4%)	1 (0%)	29	69
51	m	44/46 (96%)	43 (98%)	1 (2%)	0	100	100
52	n	175/179 (98%)	162 (93%)	11 (6%)	2 (1%)	14	52
53	o	62/65 (95%)	59 (95%)	3 (5%)	0	100	100
54	p	173/177 (98%)	161 (93%)	12 (7%)	0	100	100
55	q	36/38 (95%)	35 (97%)	1 (3%)	0	100	100
56	r	147/149 (99%)	136 (92%)	11 (8%)	0	100	100
57	s	140/142 (99%)	135 (96%)	5 (4%)	0	100	100
58	t	121/123 (98%)	111 (92%)	10 (8%)	0	100	100
59	u	142/144 (99%)	135 (95%)	7 (5%)	0	100	100
60	v	134/136 (98%)	129 (96%)	5 (4%)	0	100	100
61	w	117/127 (92%)	107 (92%)	10 (8%)	0	100	100
62	x	114/117 (97%)	108 (95%)	6 (5%)	0	100	100
63	y	112/115 (97%)	105 (94%)	7 (6%)	0	100	100
64	z	115/118 (98%)	110 (96%)	4 (4%)	1 (1%)	17	57
All	All	9368/10486 (89%)	8607 (92%)	658 (7%)	103 (1%)	18	52

All (103) 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
20	H	139	ARG
20	H	153	GLU
20	H	169	SER
20	H	306	VAL
20	H	340	ARG
27	O	56	ASP

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
36	X	103	LYS
37	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
14	AE	175	GLU
20	H	108	VAL
20	H	309	MET
20	H	333	LEU
37	Y	93	ASN
46	h	158	ALA
50	l	142	ALA
64	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
13	AC	164	ASP
13	AC	165	GLU
14	AE	51	PRO
14	AE	805	GLN
20	H	76	GLU
20	H	142	ARG
25	M	130	ASN
28	P	58	ASN
29	Q	119	ASN
37	Y	20	SER
37	Y	64	ARG
37	Y	106	GLN

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
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
14	AE	174	ASP
14	AE	193	ASP
20	H	82	THR
21	I	80	LYS
36	X	105	ASN
37	Y	83	ALA
38	Z	21	GLU
52	n	40	VAL
9	9	28	ALA
11	AA	917	SER
11	AA	991	LYS
11	AA	997	TRP
11	AA	1044	PRO
14	AE	91	GLU
20	H	70	VAL
37	Y	22	PRO
37	Y	71	LYS
37	Y	89	SER
38	Z	7	ILE
4	3	39	ILE
13	AD	210	THR
14	AE	49	PHE
14	AE	73	GLY
14	AE	904	ALA
37	Y	62	ALA
24	L	96	VAL
37	Y	23	VAL
37	Y	100	ILE
1	0	44	GLY
11	AA	697	LYS
11	AA	1159	VAL
11	AA	1317	PRO
23	K	44	GLY
29	Q	74	VAL

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Mol	Chain	Res	Type
33	U	64	GLY
9	9	54	VAL
52	n	62	GLY
11	AA	933	VAL
26	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%)	14 39
2	1	93/93 (100%)	85 (91%)	8 (9%)	10 32
3	2	81/84 (96%)	76 (94%)	5 (6%)	18 43
4	3	84/85 (99%)	78 (93%)	6 (7%)	14 39
5	4	78/78 (100%)	74 (95%)	4 (5%)	24 48
9	9	112/123 (91%)	65 (58%)	47 (42%)	0 0
11	AA	1140/1157 (98%)	1039 (91%)	101 (9%)	9 30
12	AB	86/158 (54%)	84 (98%)	2 (2%)	50 70
13	AC	198/286 (69%)	182 (92%)	16 (8%)	11 35
13	AD	196/286 (68%)	194 (99%)	2 (1%)	76 86
14	AE	1120/1168 (96%)	1051 (94%)	69 (6%)	18 43
15	C	57/65 (88%)	55 (96%)	2 (4%)	36 59
17	E	65/66 (98%)	60 (92%)	5 (8%)	13 37
18	F	60/61 (98%)	57 (95%)	3 (5%)	24 49
19	G	187/199 (94%)	178 (95%)	9 (5%)	25 51
20	H	137/461 (30%)	128 (93%)	9 (7%)	16 41
21	I	171/190 (90%)	165 (96%)	6 (4%)	36 59
22	J	172/173 (99%)	165 (96%)	7 (4%)	30 55
23	K	119/126 (94%)	112 (94%)	7 (6%)	19 45
24	L	91/116 (78%)	85 (93%)	6 (7%)	16 41

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
25	M	124/147 (84%)	116 (94%)	8 (6%)	17	42
26	N	104/105 (99%)	102 (98%)	2 (2%)	57	75
27	O	105/107 (98%)	100 (95%)	5 (5%)	25	51
28	P	86/90 (96%)	78 (91%)	8 (9%)	9	28
29	Q	90/99 (91%)	87 (97%)	3 (3%)	38	61
30	R	101/104 (97%)	94 (93%)	7 (7%)	15	40
31	S	83/84 (99%)	79 (95%)	4 (5%)	25	51
32	T	76/77 (99%)	64 (84%)	12 (16%)	2	13
33	U	65/65 (100%)	60 (92%)	5 (8%)	13	37
34	V	74/78 (95%)	72 (97%)	2 (3%)	44	65
35	W	72/79 (91%)	68 (94%)	4 (6%)	21	46
36	X	94/96 (98%)	85 (90%)	9 (10%)	8	27
37	Y	109/110 (99%)	72 (66%)	37 (34%)	0	1
38	Z	26/85 (31%)	12 (46%)	14 (54%)	0	0
40	b	58/63 (92%)	57 (98%)	1 (2%)	60	78
41	c	67/68 (98%)	64 (96%)	3 (4%)	27	52
43	e	54/55 (98%)	53 (98%)	1 (2%)	57	75
44	f	48/49 (98%)	46 (96%)	2 (4%)	30	54
45	g	59/62 (95%)	53 (90%)	6 (10%)	7	25
46	h	216/218 (99%)	199 (92%)	17 (8%)	12	35
47	i	47/48 (98%)	41 (87%)	6 (13%)	4	18
48	j	164/164 (100%)	157 (96%)	7 (4%)	29	53
49	k	47/49 (96%)	44 (94%)	3 (6%)	17	42
50	l	165/165 (100%)	151 (92%)	14 (8%)	10	33
51	m	38/38 (100%)	35 (92%)	3 (8%)	12	35
52	n	148/150 (99%)	134 (90%)	14 (10%)	8	27
53	o	51/52 (98%)	46 (90%)	5 (10%)	8	26
54	p	136/138 (99%)	132 (97%)	4 (3%)	42	64
55	q	34/34 (100%)	32 (94%)	2 (6%)	19	45
56	r	114/114 (100%)	104 (91%)	10 (9%)	10	31
57	s	116/116 (100%)	110 (95%)	6 (5%)	23	48

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
58	t	104/104 (100%)	98 (94%)	6 (6%)	20	45
59	u	103/103 (100%)	97 (94%)	6 (6%)	20	45
60	v	109/109 (100%)	103 (94%)	6 (6%)	21	47
61	w	99/103 (96%)	91 (92%)	8 (8%)	11	35
62	x	86/87 (99%)	80 (93%)	6 (7%)	15	40
63	y	99/100 (99%)	95 (96%)	4 (4%)	31	55
64	z	89/90 (99%)	87 (98%)	2 (2%)	52	71
All	All	7791/8664 (90%)	7209 (92%)	582 (8%)	17	38

All (582) 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	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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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
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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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
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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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
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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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
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	AB	21	ARG
12	AB	47	GLU
13	AC	12	ARG
13	AC	62	ASP
13	AC	65	LEU
13	AC	72	GLU
13	AC	91	ARG
13	AC	134	THR
13	AC	158	ARG
13	AC	159	ILE
13	AC	160	HIS
13	AC	162	GLU
13	AC	163	GLU
13	AC	165	GLU
13	AC	166	ARG
13	AC	168	ILE
13	AC	170	ARG
13	AC	171	LEU
13	AD	12	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
13	AD	208	ASN
14	AE	40	LYS
14	AE	42	GLU
14	AE	44	ILE
14	AE	46	TYR
14	AE	47	ARG
14	AE	49	PHE
14	AE	50	LYS
14	AE	52	GLU
14	AE	53	ARG
14	AE	54	ASP
14	AE	60	ARG
14	AE	67	ASP
14	AE	70	CYS
14	AE	72	CYS
14	AE	74	LYS
14	AE	76	LYS
14	AE	77	ARG
14	AE	78	LEU
14	AE	81	ARG
14	AE	87	LYS
14	AE	88	CYS
14	AE	91	GLU
14	AE	94	GLN
14	AE	95	THR
14	AE	99	ARG
14	AE	100	GLU
14	AE	117	LEU
14	AE	119	SER
14	AE	123	ARG
14	AE	132	LEU
14	AE	135	ILE
14	AE	142	GLU
14	AE	144	TYR
14	AE	145	VAL
14	AE	147	ILE
14	AE	152	THR
14	AE	154	LEU
14	AE	157	GLN
14	AE	159	ILE
14	AE	175	GLU
14	AE	180	MET

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
14	AE	190	LYS
14	AE	193	ASP
14	AE	196	GLN
14	AE	210	SER
14	AE	215	LYS
14	AE	216	LYS
14	AE	222	LYS
14	AE	223	LEU
14	AE	227	PHE
14	AE	232	ASN
14	AE	233	LYS
14	AE	237	MET
14	AE	238	ILE
14	AE	239	LEU
14	AE	240	THR
14	AE	244	VAL
14	AE	271	ARG
14	AE	385	LEU
14	AE	386	GLU
14	AE	390	LEU
14	AE	393	THR
14	AE	394	ILE
14	AE	395	LYS
14	AE	514	THR
14	AE	709	ARG
14	AE	836	ARG
14	AE	1172	LYS
14	AE	1373	ARG
15	C	33	ILE
15	C	74	HIS
17	E	6	SER
17	E	10	ARG
17	E	48	GLN
17	E	54	MET
17	E	64	LYS
18	F	34	ARG
18	F	62	ARG
18	F	67	ARG
19	G	8	ASP
19	G	23	TRP
19	G	45	LYS
19	G	105	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
19	G	108	ARG
19	G	128	LYS
19	G	129	LEU
19	G	132	LYS
19	G	208	ARG
20	H	9	PHE
20	H	54	LYS
20	H	273	ARG
20	H	305	HIS
20	H	336	ASP
20	H	337	GLU
20	H	338	GLU
20	H	339	ARG
20	H	340	ARG
21	I	14	ILE
21	I	75	ILE
21	I	89	LYS
21	I	164	ARG
21	I	185	ASN
21	I	200	VAL
22	J	47	ARG
22	J	48	LEU
22	J	95	GLU
22	J	104	ARG
22	J	116	GLN
22	J	138	SER
22	J	143	VAL
23	K	10	GLU
23	K	15	LEU
23	K	60	ILE
23	K	114	VAL
23	K	115	LEU
23	K	138	ARG
23	K	162	GLU
24	L	16	GLU
24	L	24	ARG
24	L	38	ARG
24	L	54	LEU
24	L	79	ARG
24	L	86	ARG
25	M	7	ILE
25	M	17	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
25	M	21	GLU
25	M	23	LEU
25	M	79	ARG
25	M	109	ARG
25	M	130	ASN
25	M	146	GLU
26	N	96	MET
26	N	121	LEU
27	O	12	ARG
27	O	27	LYS
27	O	60	LYS
27	O	63	LEU
27	O	118	LEU
28	P	5	ARG
28	P	17	LEU
28	P	24	GLU
28	P	25	ILE
28	P	27	GLU
28	P	37	ARG
28	P	87	LEU
28	P	90	LEU
29	Q	15	GLN
29	Q	56	ARG
29	Q	107	ILE
30	R	5	ASN
30	R	12	ARG
30	R	24	LEU
30	R	56	ARG
30	R	62	GLU
30	R	74	LEU
30	R	102	LEU
31	S	45	VAL
31	S	46	LEU
31	S	89	MET
31	S	92	GLU
32	T	10	LYS
32	T	17	ARG
32	T	22	THR
32	T	39	LEU
32	T	40	GLN
32	T	64	ARG
32	T	66	LEU

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

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
37	Y	78	LEU
37	Y	80	LYS
37	Y	81	LYS
37	Y	91	LYS
37	Y	94	LYS
37	Y	95	ASP
37	Y	99	LYS
37	Y	100	ILE
37	Y	101	SER
37	Y	102	ARG
37	Y	104	GLN
37	Y	108	ILE
37	Y	112	LYS
37	Y	116	MET
37	Y	120	ASP
37	Y	124	MET
37	Y	125	THR
37	Y	126	ARG
37	Y	133	ARG
37	Y	135	MET
38	Z	1	SER
38	Z	2	ILE
38	Z	4	LYS
38	Z	6	GLN
38	Z	7	ILE
38	Z	8	ILE
38	Z	14	MET
38	Z	15	SER
38	Z	16	VAL
38	Z	23	ILE
38	Z	26	MET
38	Z	28	GLU
38	Z	29	LYS
38	Z	30	PHE
40	b	70	GLU
41	c	48	THR
41	c	54	LYS
41	c	71	LEU
43	e	58	ASN
44	f	3	LYS
44	f	45	ARG
45	g	3	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
45	g	16	CYS
45	g	43	PHE
45	g	47	LYS
45	g	59	ARG
45	g	65	ASN
46	h	51	THR
46	h	52	ARG
46	h	118	SER
46	h	125	LYS
46	h	130	LEU
46	h	141	VAL
46	h	156	ARG
46	h	187	ASP
46	h	189	ARG
46	h	195	VAL
46	h	202	LEU
46	h	203	ARG
46	h	204	VAL
46	h	205	LEU
46	h	242	LYS
46	h	258	ARG
46	h	271	ARG
47	i	9	THR
47	i	12	LYS
47	i	26	THR
47	i	27	SER
47	i	29	SER
47	i	40	ARG
48	j	13	ARG
48	j	18	ASP
48	j	32	ASN
48	j	46	ARG
48	j	91	THR
48	j	103	ASP
48	j	131	ASP
49	k	5	ILE
49	k	24	THR
49	k	26	ASN
50	l	7	ASP
50	l	17	THR
50	l	22	ASP
50	l	40	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
50	l	48	THR
50	l	57	LYS
50	l	69	ARG
50	l	77	ILE
50	l	80	SER
50	l	108	ILE
50	l	109	LEU
50	l	122	GLU
50	l	149	ILE
50	l	179	SER
51	m	22	MET
51	m	41	ARG
51	m	42	LEU
52	n	6	ASP
52	n	10	ASP
52	n	57	LEU
52	n	80	ARG
52	n	95	ARG
52	n	105	THR
52	n	115	ARG
52	n	117	LEU
52	n	122	PHE
52	n	123	ASP
52	n	133	ARG
52	n	140	GLU
52	n	152	LEU
52	n	163	ASP
53	o	8	ARG
53	o	30	ARG
53	o	31	HIS
53	o	54	ASP
53	o	55	LEU
54	p	39	ASP
54	p	95	ARG
54	p	125	CYS
54	p	171	THR
55	q	3	VAL
55	q	26	ILE
56	r	11	ASN
56	r	12	LEU
56	r	15	LEU
56	r	41	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
56	r	66	ASN
56	r	72	ILE
56	r	87	GLU
56	r	97	ARG
56	r	101	ASP
56	r	127	GLU
57	s	1	MET
57	s	14	ASP
57	s	30	THR
57	s	40	HIS
57	s	57	LEU
57	s	142	ILE
58	t	32	TYR
58	t	49	ARG
58	t	53	LYS
58	t	80	ASP
58	t	88	ASN
58	t	104	THR
59	u	5	THR
59	u	27	LEU
59	u	48	ARG
59	u	59	ARG
59	u	76	GLU
59	u	78	ARG
60	v	18	ARG
60	v	40	ARG
60	v	84	LYS
60	v	110	GLU
60	v	126	ILE
60	v	128	THR
61	w	2	ARG
61	w	20	MET
61	w	24	MET
61	w	51	LEU
61	w	63	ARG
61	w	65	LEU
61	w	69	ARG
61	w	95	THR
62	x	13	ARG
62	x	19	GLN
62	x	31	THR
62	x	47	VAL

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Mol	Chain	Res	Type
62	x	48	LEU
62	x	91	SER
63	y	10	GLN
63	y	27	GLU
63	y	85	SER
63	y	114	LEU
64	z	18	LEU
64	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
19	G	18	HIS
23	K	70	ASN
32	T	40	GLN
36	X	105	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%)
16	D	1515/1542 (98%)	288 (19%)	35 (2%)
39	a	2859/2904 (98%)	533 (18%)	0
42	d	119/120 (99%)	17 (14%)	0
8	7	20/33 (60%)	11 (55%)	3 (15%)
All	All	4663/4751 (98%)	913 (19%)	50 (1%)

All (913) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
8	7	-18	G
8	7	-17	U
8	7	-16	U
8	7	-14	U
8	7	-13	U
8	7	-12	U
8	7	-11	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
8	7	-10	U
8	7	-9	U
8	7	-8	U
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
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

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
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
16	D	4	U
16	D	5	U
16	D	9	G
16	D	22	G
16	D	29	U
16	D	32	A
16	D	39	G
16	D	41	G
16	D	47	C
16	D	48	C
16	D	50	A
16	D	51	A
16	D	52	C
16	D	54	C
16	D	69	G
16	D	70	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
16	D	71	A
16	D	72	A
16	D	74	A
16	D	76	G
16	D	82	G
16	D	83	C
16	D	84	U
16	D	87	C
16	D	90	C
16	D	94	G
16	D	95	C
16	D	96	U
16	D	108	G
16	D	120	A
16	D	122	G
16	D	128	G
16	D	131	A
16	D	141	G
16	D	144	G
16	D	148	G
16	D	149	A
16	D	160	A
16	D	164	G
16	D	173	U
16	D	181	A
16	D	182	A
16	D	197	A
16	D	198	G
16	D	204	G
16	D	208	U
16	D	209	U
16	D	210	C
16	D	211	G
16	D	212	G
16	D	216	U
16	D	226	G
16	D	245	U
16	D	247	G
16	D	251	G
16	D	258	G
16	D	262	A
16	D	266	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
16	D	267	C
16	D	271	C
16	D	279	A
16	D	289	G
16	D	299	G
16	D	306	A
16	D	321	A
16	D	328	C
16	D	329	A
16	D	332	G
16	D	347	G
16	D	352	C
16	D	353	A
16	D	354	G
16	D	355	C
16	D	367	U
16	D	372	C
16	D	373	A
16	D	376	G
16	D	382	A
16	D	384	G
16	D	392	C
16	D	393	A
16	D	397	A
16	D	406	G
16	D	412	A
16	D	413	G
16	D	414	A
16	D	421	U
16	D	422	C
16	D	424	G
16	D	429	U
16	D	446	G
16	D	451	A
16	D	457	G
16	D	458	U
16	D	460	A
16	D	463	U
16	D	464	U
16	D	467	U
16	D	468	A
16	D	469	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
16	D	478	A
16	D	479	U
16	D	481	G
16	D	484	G
16	D	485	U
16	D	486	U
16	D	505	G
16	D	509	A
16	D	511	C
16	D	518	C
16	D	519	C
16	D	526	C
16	D	531	U
16	D	532	A
16	D	533	A
16	D	542	G
16	D	547	A
16	D	559	A
16	D	562	U
16	D	568	G
16	D	572	A
16	D	573	A
16	D	576	C
16	D	577	G
16	D	579	A
16	D	596	A
16	D	628	G
16	D	633	G
16	D	642	A
16	D	649	A
16	D	650	G
16	D	653	U
16	D	665	A
16	D	666	G
16	D	687	A
16	D	700	G
16	D	723	U
16	D	724	G
16	D	731	G
16	D	734	G
16	D	747	A
16	D	748	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
16	D	755	G
16	D	760	G
16	D	777	A
16	D	793	U
16	D	794	A
16	D	815	A
16	D	817	C
16	D	828	U
16	D	829	G
16	D	832	G
16	D	841	C
16	D	844	G
16	D	845	A
16	D	849	G
16	D	874	G
16	D	887	G
16	D	902	G
16	D	914	A
16	D	916	U
16	D	926	G
16	D	934	C
16	D	935	A
16	D	954	G
16	D	960	U
16	D	963	G
16	D	969	A
16	D	972	C
16	D	975	A
16	D	976	G
16	D	991	U
16	D	992	U
16	D	993	G
16	D	996	A
16	D	999	C
16	D	1004	A
16	D	1008	U
16	D	1009	U
16	D	1017	U
16	D	1018	G
16	D	1021	A
16	D	1024	G
16	D	1026	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
16	D	1028	C
16	D	1030	U
16	D	1031	C
16	D	1037	C
16	D	1043	G
16	D	1044	A
16	D	1046	A
16	D	1065	U
16	D	1085	U
16	D	1086	U
16	D	1094	G
16	D	1095	U
16	D	1099	G
16	D	1101	A
16	D	1124	G
16	D	1133	G
16	D	1135	U
16	D	1136	C
16	D	1137	C
16	D	1139	G
16	D	1140	C
16	D	1141	C
16	D	1142	G
16	D	1143	G
16	D	1145	A
16	D	1146	A
16	D	1151	A
16	D	1152	A
16	D	1158	C
16	D	1159	U
16	D	1167	A
16	D	1171	A
16	D	1174	G
16	D	1175	G
16	D	1176	A
16	D	1184	G
16	D	1196	A
16	D	1197	A
16	D	1206	G
16	D	1211	U
16	D	1212	U
16	D	1213	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
16	D	1214	C
16	D	1215	G
16	D	1226	C
16	D	1227	A
16	D	1228	C
16	D	1238	A
16	D	1256	A
16	D	1257	A
16	D	1260	G
16	D	1275	A
16	D	1276	G
16	D	1278	G
16	D	1279	G
16	D	1280	A
16	D	1285	A
16	D	1286	U
16	D	1287	A
16	D	1299	A
16	D	1300	G
16	D	1302	C
16	D	1305	G
16	D	1312	G
16	D	1317	C
16	D	1320	C
16	D	1323	G
16	D	1329	A
16	D	1338	G
16	D	1340	A
16	D	1346	A
16	D	1347	G
16	D	1353	G
16	D	1363	A
16	D	1370	G
16	D	1378	C
16	D	1379	G
16	D	1381	U
16	D	1391	U
16	D	1396	A
16	D	1397	C
16	D	1398	A
16	D	1404	C
16	D	1419	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
16	D	1429	A
16	D	1441	A
16	D	1446	A
16	D	1447	A
16	D	1448	C
16	D	1452	C
16	D	1453	G
16	D	1475	G
16	D	1487	G
16	D	1492	A
16	D	1493	A
16	D	1494	G
16	D	1495	U
16	D	1497	G
16	D	1503	A
16	D	1506	U
16	D	1517	G
16	D	1529	G
16	D	1530	G
16	D	1534	A
39	a	10	A
39	a	15	G
39	a	34	U
39	a	35	G
39	a	46	G
39	a	58	G
39	a	60	G
39	a	63	A
39	a	71	A
39	a	74	A
39	a	75	G
39	a	83	A
39	a	84	A
39	a	85	G
39	a	93	G
39	a	96	C
39	a	102	U
39	a	103	A
39	a	110	G
39	a	114	U
39	a	118	A
39	a	119	A

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	120	U
39	a	122	G
39	a	131	A
39	a	136	G
39	a	139	U
39	a	140	C
39	a	141	G
39	a	145	C
39	a	163	C
39	a	165	A
39	a	181	A
39	a	196	A
39	a	200	U
39	a	215	G
39	a	216	A
39	a	222	A
39	a	225	C
39	a	248	G
39	a	249	C
39	a	261	G
39	a	264	C
39	a	265	A
39	a	266	G
39	a	267	C
39	a	271	G
39	a	272	A
39	a	275	C
39	a	276	U
39	a	278	A
39	a	285	G
39	a	311	A
39	a	324	A
39	a	329	G
39	a	330	A
39	a	353	C
39	a	359	G
39	a	361	G
39	a	362	A
39	a	371	A
39	a	372	G
39	a	373	U
39	a	375	G

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	383	C
39	a	386	G
39	a	396	G
39	a	405	U
39	a	411	G
39	a	412	A
39	a	420	C
39	a	424	G
39	a	435	C
39	a	451	U
39	a	456	C
39	a	457	A
39	a	477	A
39	a	481	G
39	a	491	G
39	a	501	A
39	a	503	A
39	a	504	A
39	a	505	A
39	a	509	C
39	a	522	A
39	a	529	A
39	a	532	A
39	a	543	G
39	a	546	U
39	a	547	A
39	a	548	G
39	a	549	G
39	a	551	G
39	a	563	A
39	a	569	U
39	a	573	U
39	a	575	A
39	a	588	U
39	a	603	A
39	a	609	A
39	a	613	A
39	a	614	A
39	a	615	U
39	a	616	A
39	a	618	G
39	a	621	A

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	627	A
39	a	637	A
39	a	645	C
39	a	647	G
39	a	654	A
39	a	664	G
39	a	668	A
39	a	685	A
39	a	686	U
39	a	710	U
39	a	717	C
39	a	730	A
39	a	738	G
39	a	757	G
39	a	764	A
39	a	765	C
39	a	775	G
39	a	776	G
39	a	782	A
39	a	784	G
39	a	785	G
39	a	800	A
39	a	802	A
39	a	805	G
39	a	812	C
39	a	819	A
39	a	827	U
39	a	828	U
39	a	845	A
39	a	846	U
39	a	858	G
39	a	859	G
39	a	869	G
39	a	878	A
39	a	881	G
39	a	884	U
39	a	885	C
39	a	888	C
39	a	891	G
39	a	892	A
39	a	893	C
39	a	895	U

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	896	A
39	a	897	C
39	a	899	A
39	a	907	G
39	a	910	A
39	a	914	G
39	a	915	C
39	a	931	U
39	a	941	A
39	a	945	A
39	a	946	C
39	a	953	G
39	a	961	C
39	a	974	G
39	a	983	A
39	a	995	C
39	a	996	A
39	a	999	U
39	a	1005	C
39	a	1012	U
39	a	1013	C
39	a	1022	G
39	a	1023	U
39	a	1026	G
39	a	1033	U
39	a	1041	G
39	a	1045	C
39	a	1046	A
39	a	1047	G
39	a	1060	U
39	a	1061	U
39	a	1062	G
39	a	1063	G
39	a	1064	C
39	a	1065	U
39	a	1066	U
39	a	1067	A
39	a	1068	G
39	a	1069	A
39	a	1070	A
39	a	1071	G
39	a	1073	A

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	1074	G
39	a	1076	C
39	a	1079	C
39	a	1080	A
39	a	1081	U
39	a	1082	U
39	a	1083	U
39	a	1084	A
39	a	1087	G
39	a	1088	A
39	a	1090	A
39	a	1095	A
39	a	1096	A
39	a	1107	G
39	a	1110	G
39	a	1111	A
39	a	1112	G
39	a	1119	U
39	a	1122	G
39	a	1132	U
39	a	1134	A
39	a	1135	C
39	a	1142	A
39	a	1169	A
39	a	1170	C
39	a	1173	U
39	a	1174	U
39	a	1175	A
39	a	1176	U
39	a	1177	G
39	a	1178	C
39	a	1179	G
39	a	1180	U
39	a	1186	G
39	a	1238	G
39	a	1248	G
39	a	1253	A
39	a	1256	G
39	a	1266	G
39	a	1271	G
39	a	1272	A
39	a	1273	U

*Continued on next page...*

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	1301	A
39	a	1321	A
39	a	1345	C
39	a	1352	U
39	a	1365	A
39	a	1368	G
39	a	1378	A
39	a	1379	U
39	a	1380	G
39	a	1383	A
39	a	1387	A
39	a	1392	A
39	a	1395	A
39	a	1406	U
39	a	1407	G
39	a	1408	G
39	a	1411	U
39	a	1414	C
39	a	1415	U
39	a	1416	G
39	a	1417	C
39	a	1419	A
39	a	1420	A
39	a	1428	C
39	a	1452	G
39	a	1453	A
39	a	1460	U
39	a	1478	G
39	a	1482	G
39	a	1490	A
39	a	1497	U
39	a	1503	A
39	a	1508	A
39	a	1509	A
39	a	1510	G
39	a	1515	A
39	a	1529	G
39	a	1534	U
39	a	1535	A
39	a	1536	C
39	a	1537	G
39	a	1554	U

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	1559	U
39	a	1566	A
39	a	1569	A
39	a	1578	U
39	a	1580	A
39	a	1581	G
39	a	1582	C
39	a	1583	A
39	a	1584	U
39	a	1589	U
39	a	1590	A
39	a	1608	A
39	a	1609	A
39	a	1610	A
39	a	1647	U
39	a	1648	U
39	a	1649	G
39	a	1651	G
39	a	1674	G
39	a	1677	A
39	a	1703	G
39	a	1714	U
39	a	1715	G
39	a	1718	G
39	a	1729	U
39	a	1730	C
39	a	1732	C
39	a	1738	G
39	a	1750	G
39	a	1755	A
39	a	1758	U
39	a	1764	C
39	a	1773	A
39	a	1791	A
39	a	1800	C
39	a	1801	A
39	a	1808	A
39	a	1811	G
39	a	1816	C
39	a	1829	A
39	a	1833	C
39	a	1847	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	1848	A
39	a	1858	A
39	a	1859	U
39	a	1862	G
39	a	1864	U
39	a	1869	G
39	a	1870	C
39	a	1872	A
39	a	1873	G
39	a	1905	C
39	a	1906	G
39	a	1907	G
39	a	1913	A
39	a	1914	C
39	a	1919	A
39	a	1920	C
39	a	1922	G
39	a	1923	U
39	a	1924	C
39	a	1925	C
39	a	1926	U
39	a	1928	A
39	a	1929	G
39	a	1930	G
39	a	1936	A
39	a	1938	A
39	a	1955	U
39	a	1965	C
39	a	1967	C
39	a	1970	A
39	a	1971	U
39	a	1972	G
39	a	1987	A
39	a	1991	U
39	a	1992	G
39	a	1993	U
39	a	1997	C
39	a	2002	G
39	a	2022	U
39	a	2023	C
39	a	2027	G
39	a	2033	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	2043	C
39	a	2051	A
39	a	2052	A
39	a	2055	C
39	a	2056	G
39	a	2060	A
39	a	2061	G
39	a	2062	A
39	a	2077	A
39	a	2093	G
39	a	2097	A
39	a	2099	U
39	a	2100	G
39	a	2108	A
39	a	2110	G
39	a	2111	U
39	a	2113	U
39	a	2115	G
39	a	2116	G
39	a	2117	A
39	a	2118	U
39	a	2121	G
39	a	2122	U
39	a	2124	G
39	a	2125	G
39	a	2126	A
39	a	2127	G
39	a	2128	G
39	a	2131	U
39	a	2132	U
39	a	2133	G
39	a	2134	A
39	a	2139	U
39	a	2141	G
39	a	2146	C
39	a	2147	A
39	a	2154	A
39	a	2157	G
39	a	2158	A
39	a	2159	G
39	a	2162	G
39	a	2163	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	2164	C
39	a	2165	C
39	a	2169	A
39	a	2171	A
39	a	2172	U
39	a	2178	C
39	a	2182	U
39	a	2183	A
39	a	2185	U
39	a	2188	U
39	a	2189	U
39	a	2190	G
39	a	2191	A
39	a	2193	G
39	a	2194	U
39	a	2198	A
39	a	2204	G
39	a	2210	U
39	a	2211	A
39	a	2212	A
39	a	2213	U
39	a	2225	A
39	a	2226	C
39	a	2229	U
39	a	2238	G
39	a	2239	G
39	a	2244	U
39	a	2250	G
39	a	2268	A
39	a	2278	A
39	a	2283	C
39	a	2287	A
39	a	2297	A
39	a	2305	U
39	a	2308	G
39	a	2309	A
39	a	2315	G
39	a	2322	A
39	a	2325	G
39	a	2327	A
39	a	2333	A
39	a	2339	C

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	2345	G
39	a	2347	C
39	a	2350	C
39	a	2361	G
39	a	2372	U
39	a	2376	A
39	a	2383	G
39	a	2385	C
39	a	2402	U
39	a	2403	C
39	a	2406	A
39	a	2423	U
39	a	2424	C
39	a	2425	A
39	a	2426	A
39	a	2429	G
39	a	2430	A
39	a	2431	U
39	a	2434	A
39	a	2435	A
39	a	2441	U
39	a	2447	G
39	a	2448	A
39	a	2470	G
39	a	2474	U
39	a	2476	A
39	a	2478	A
39	a	2484	G
39	a	2491	U
39	a	2502	G
39	a	2506	U
39	a	2507	C
39	a	2512	C
39	a	2513	A
39	a	2518	A
39	a	2520	C
39	a	2525	G
39	a	2529	G
39	a	2535	G
39	a	2547	A
39	a	2554	U
39	a	2566	A

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	2567	G
39	a	2572	A
39	a	2573	C
39	a	2574	G
39	a	2585	U
39	a	2586	U
39	a	2602	A
39	a	2603	G
39	a	2609	U
39	a	2610	C
39	a	2611	C
39	a	2613	U
39	a	2629	U
39	a	2663	G
39	a	2669	G
39	a	2671	G
39	a	2689	U
39	a	2690	U
39	a	2714	G
39	a	2722	G
39	a	2726	A
39	a	2744	G
39	a	2748	A
39	a	2757	A
39	a	2758	A
39	a	2765	A
39	a	2777	G
39	a	2778	A
39	a	2791	G
39	a	2793	C
39	a	2796	U
39	a	2797	U
39	a	2798	U
39	a	2799	A
39	a	2801	G
39	a	2818	U
39	a	2820	A
39	a	2823	A
39	a	2825	G
39	a	2849	U
39	a	2850	A
39	a	2859	G

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
39	a	2861	U
39	a	2867	G
39	a	2880	C
39	a	2884	U
39	a	2885	G
39	a	2891	U
39	a	2902	C
42	d	2	G
42	d	9	G
42	d	13	G
42	d	16	G
42	d	17	C
42	d	35	C
42	d	36	C
42	d	45	A
42	d	51	G
42	d	56	G
42	d	64	G
42	d	66	A
42	d	88	C
42	d	89	U
42	d	90	C
42	d	99	A
42	d	109	A

All (50) RNA pucker outliers are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
8	7	-17	U
8	7	-14	U
8	7	-11	U
10	A	6	G
10	A	7	G
10	A	9	G
10	A	22	G
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

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
10	B	60	U
16	D	7	A
16	D	70	U
16	D	121	U
16	D	181	A
16	D	183	C
16	D	197	A
16	D	209	U
16	D	305	G
16	D	328	C
16	D	428	G
16	D	496	A
16	D	517	G
16	D	531	U
16	D	532	A
16	D	562	U
16	D	641	U
16	D	722	G
16	D	793	U
16	D	991	U
16	D	992	U
16	D	1109	C
16	D	1145	A
16	D	1196	A
16	D	1211	U
16	D	1212	U
16	D	1213	A
16	D	1214	C
16	D	1225	A
16	D	1299	A
16	D	1396	A
16	D	1432	G
16	D	1447	A
16	D	1491	G
16	D	1492	A
16	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 monosaccharides 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.

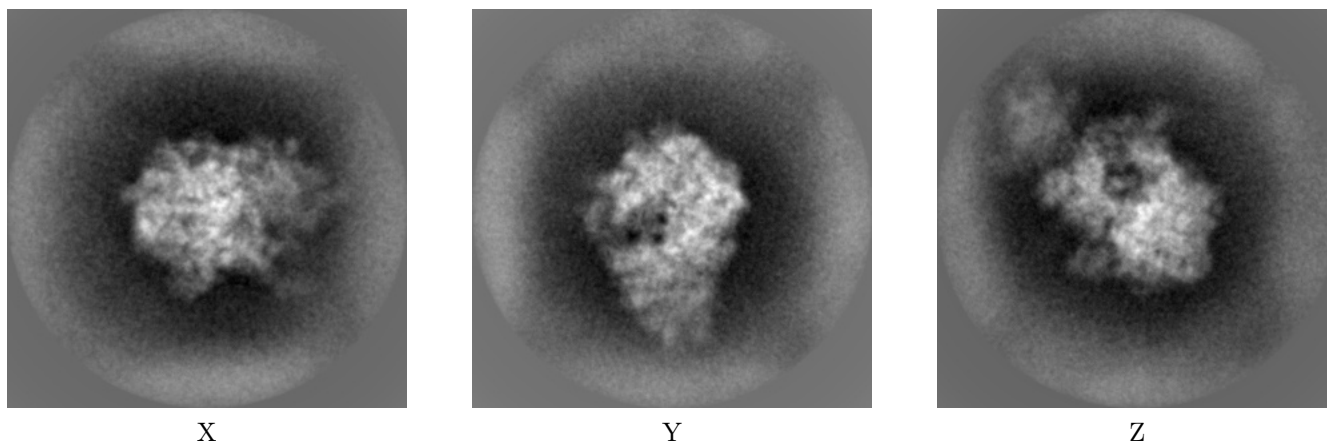
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22193. 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](#)

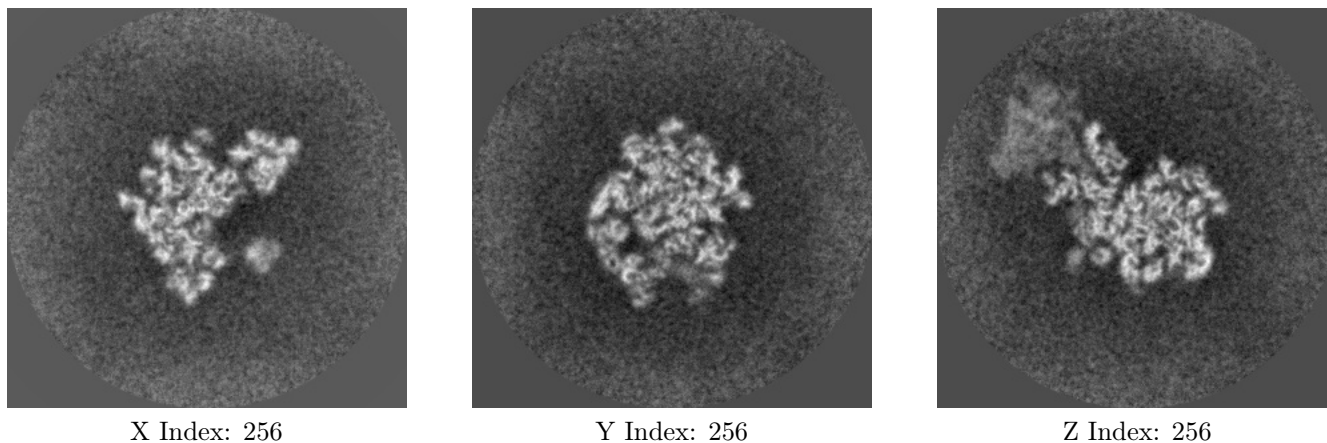
#### 6.1.1 Primary map



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

### 6.2 Central slices [i](#)

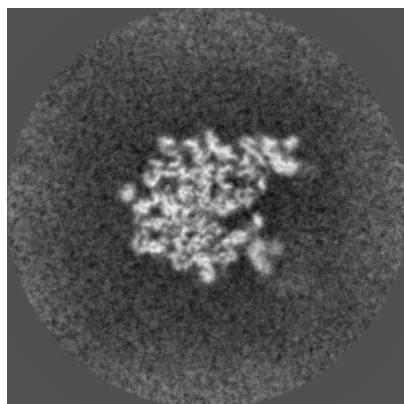
#### 6.2.1 Primary map



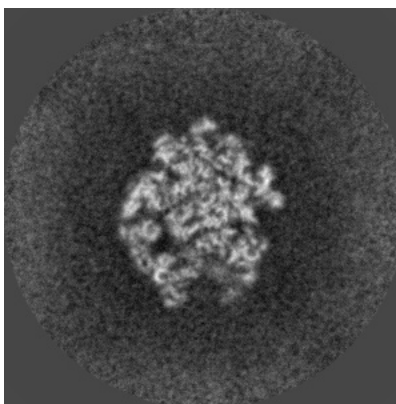
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

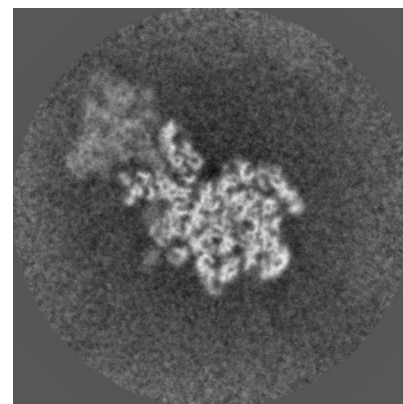
### 6.3.1 Primary map



X Index: 272



Y Index: 257



Z Index: 258

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

## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.009. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

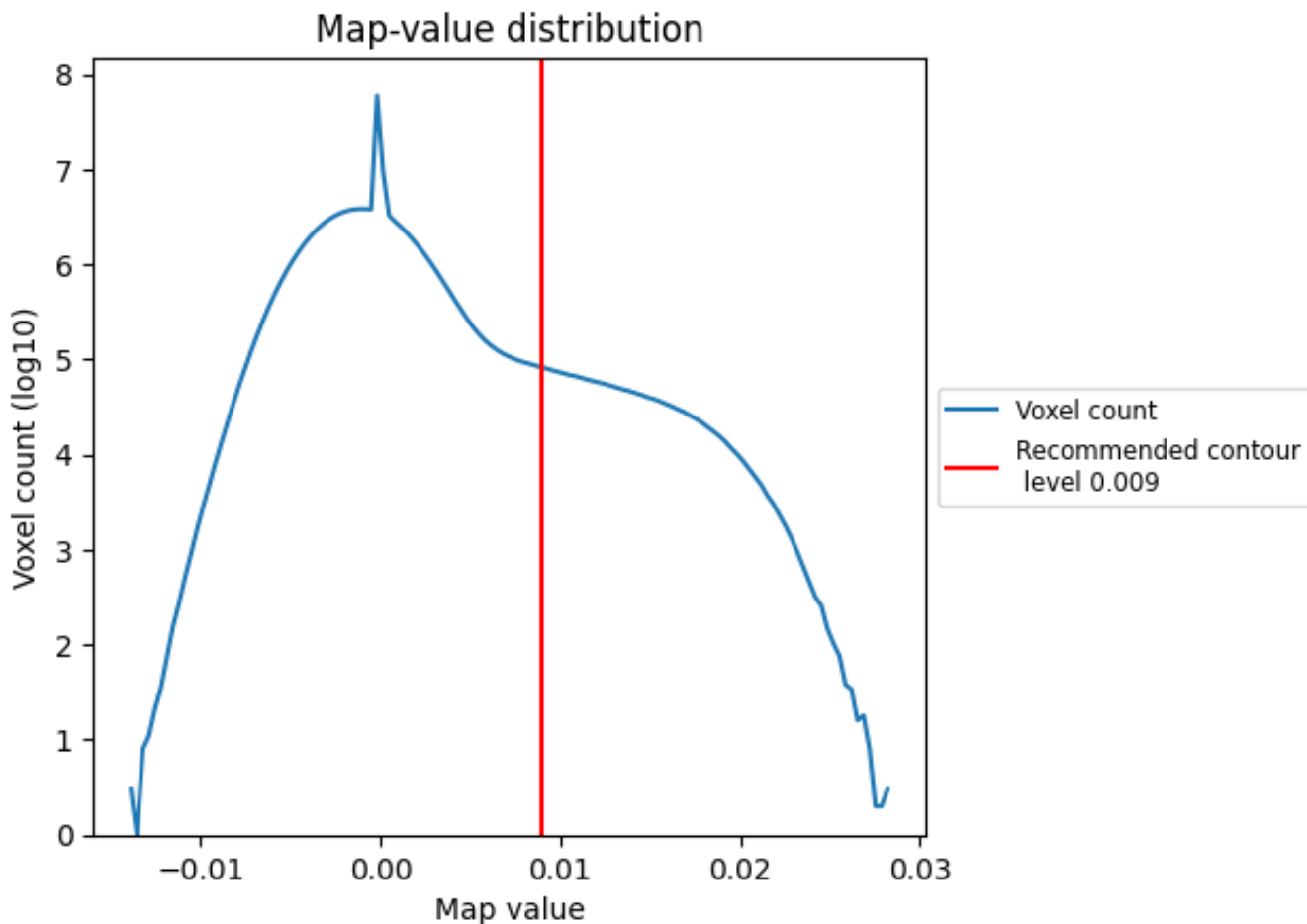
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

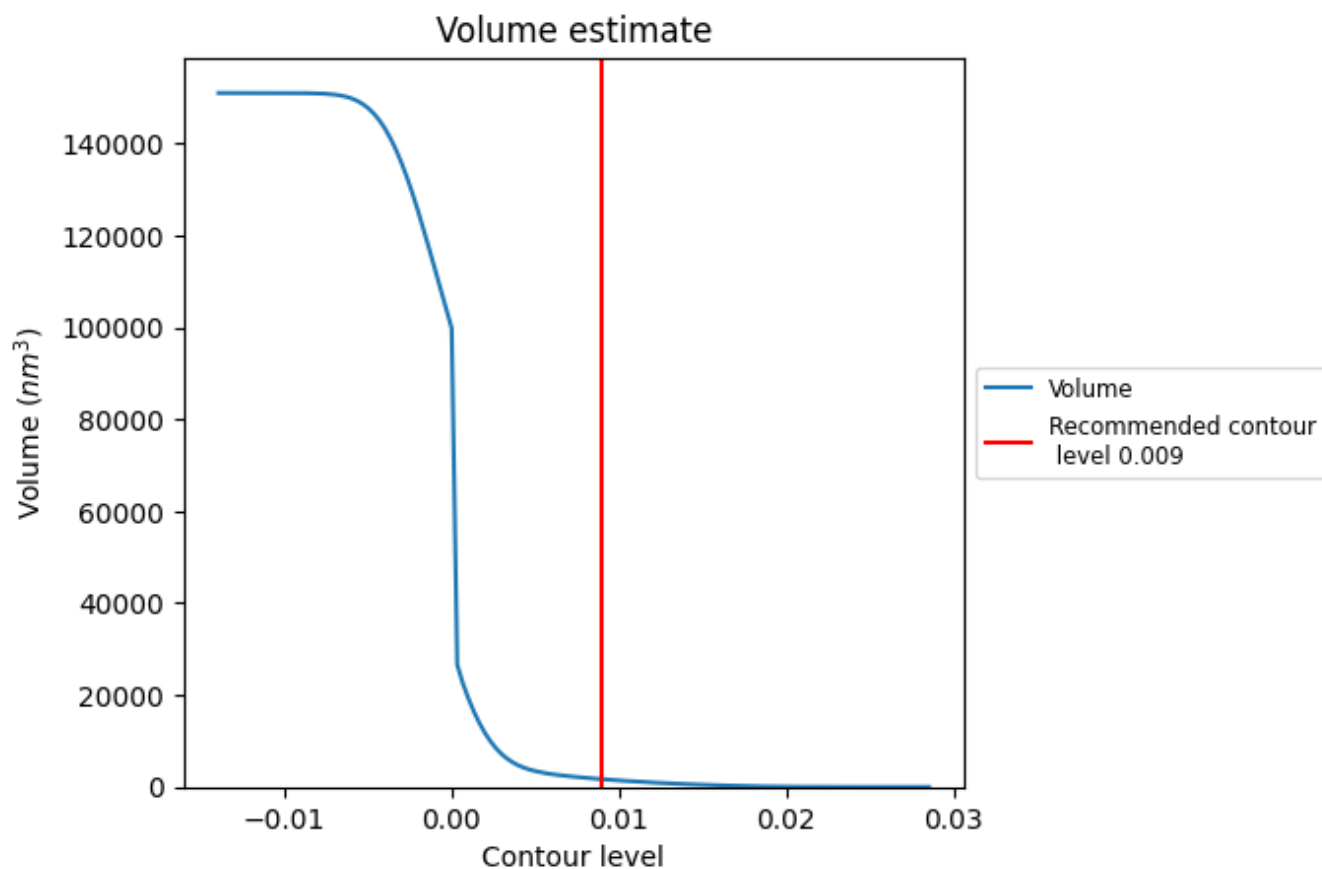
This section contains the results of statistical analysis of the map.

### 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.

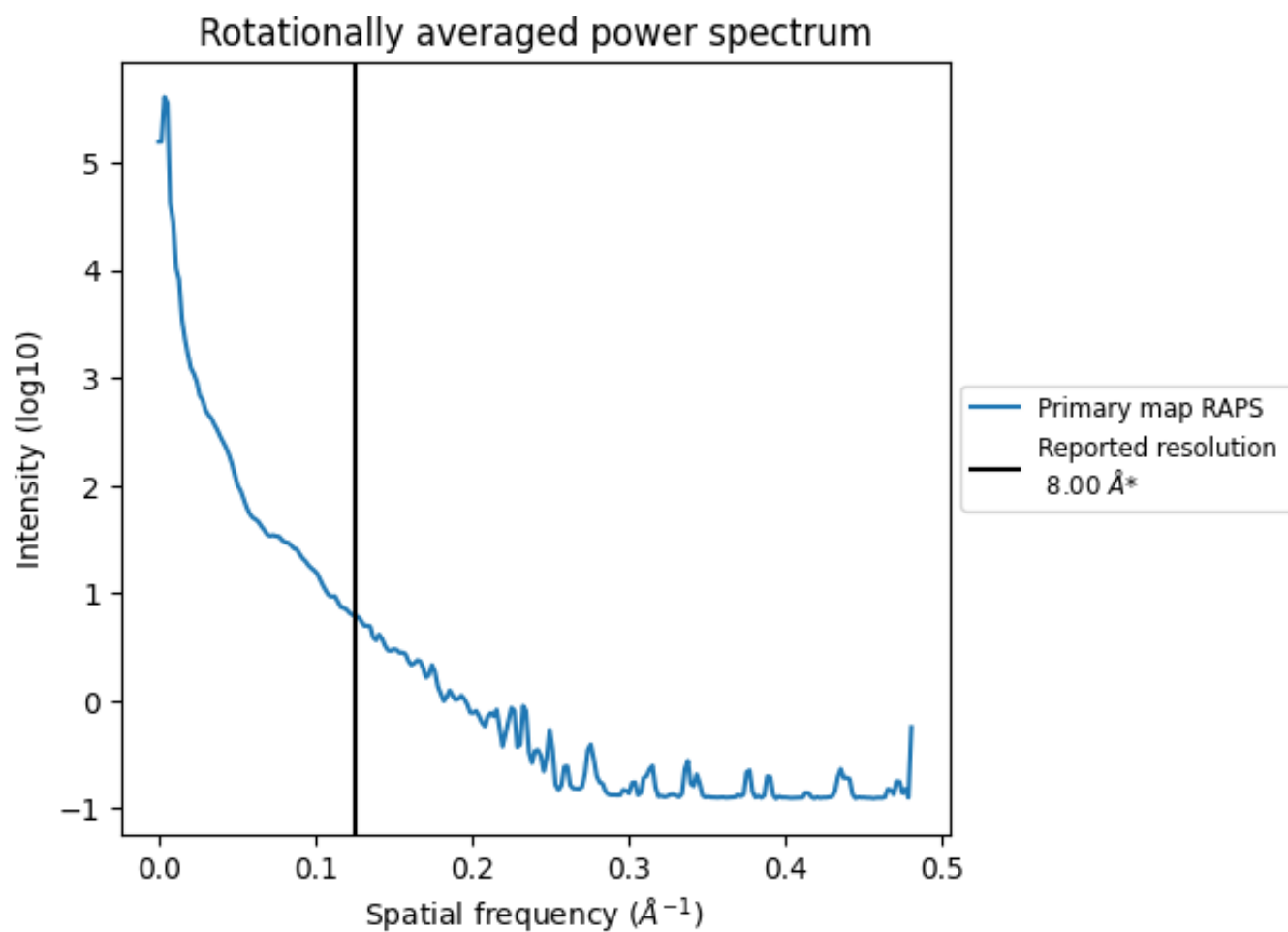
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1692  $\text{nm}^3$ ; this corresponds to an approximate mass of 1529 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 0.125 Å<sup>-1</sup>

## 8 Fourier-Shell correlation

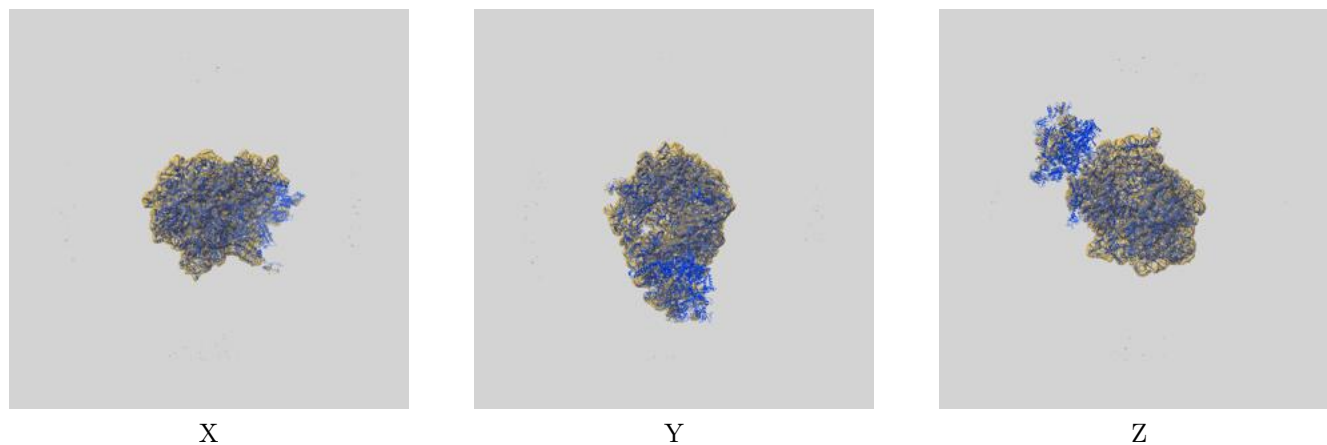
This section was not generated. No FSC curve or half-maps provided.



## 9 Map-model fit [i](#)

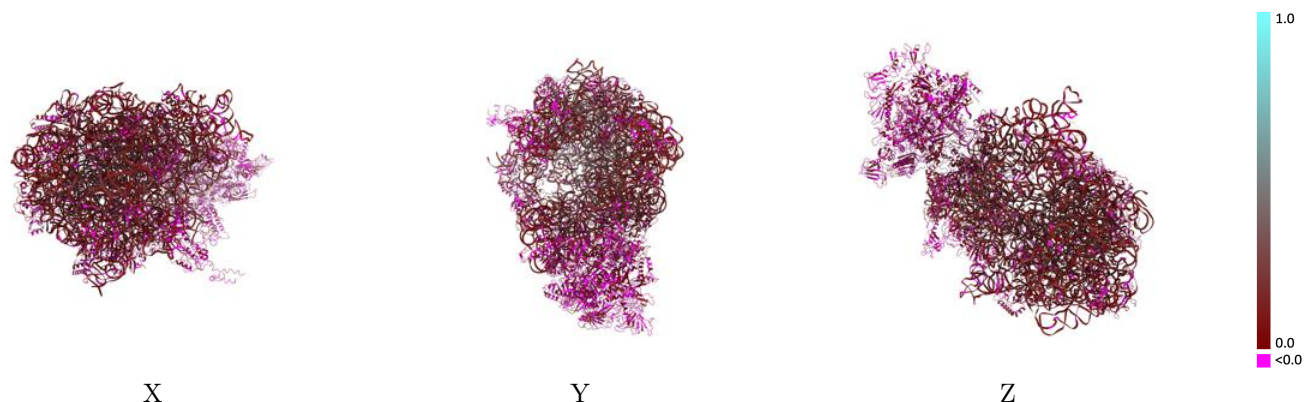
This section contains information regarding the fit between EMDB map EMD-22193 and PDB model 6XIJ. Per-residue inclusion information can be found in section 3 on page 16.

### 9.1 Map-model overlay [i](#)



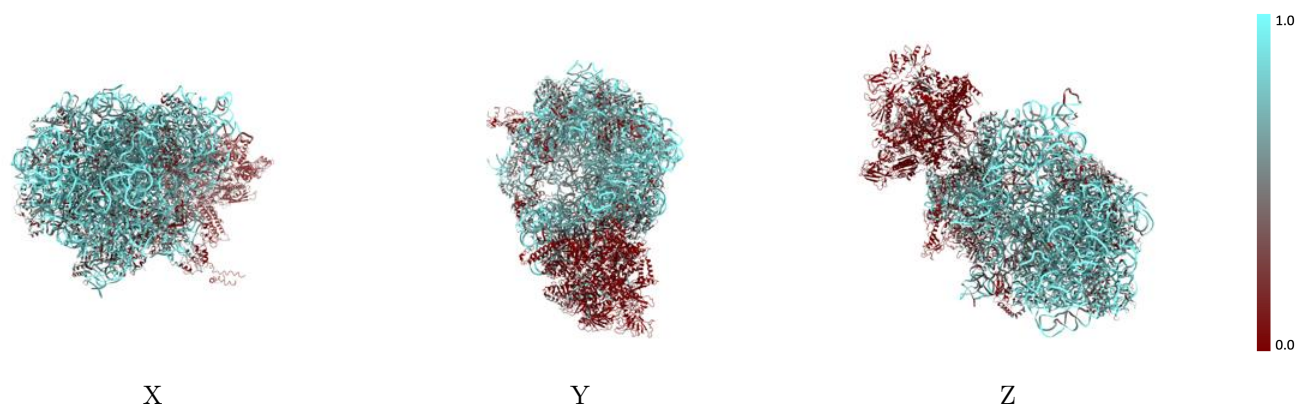
The images above show the 3D surface view of the map at the recommended contour level 0.009 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



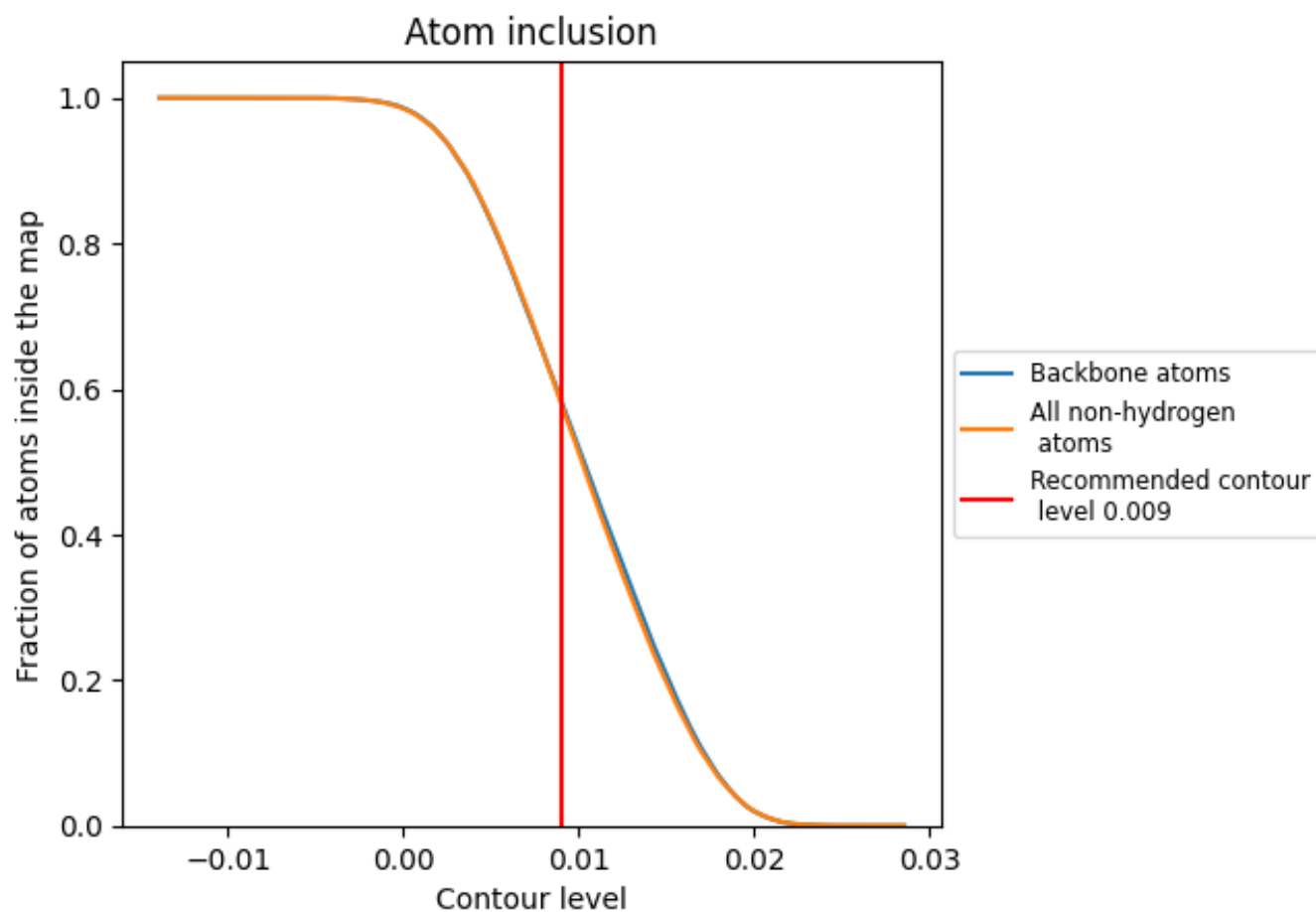
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.009).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 58% of all backbone atoms, 58% 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 (0.009) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5807	 0.1280
0	 0.5508	 0.1000
1	 0.5060	 0.1330
2	 0.4397	 0.0890
3	 0.5786	 0.0730
4	 0.5799	 0.1160
5	 0.1208	 0.0280
6	 0.1402	 0.1000
7	 0.2591	 0.0880
9	 0.2294	 0.0370
A	 0.5562	 0.1330
AA	 0.0861	 0.0410
AB	 0.0000	 0.0390
AC	 0.0315	 0.0410
AD	 0.0156	 0.0600
AE	 0.0403	 0.0400
B	 0.5321	 0.0790
C	 0.3499	 0.1010
D	 0.8241	 0.1720
E	 0.4847	 0.0870
F	 0.2934	 0.1420
G	 0.4349	 0.1050
H	 0.0093	 0.0250
I	 0.3283	 0.1090
J	 0.3931	 0.1010
K	 0.4504	 0.1640
L	 0.4099	 0.1070
M	 0.3785	 0.1060
N	 0.4760	 0.1400
O	 0.4545	 0.0520
P	 0.3895	 0.0860
Q	 0.3751	 0.1120
R	 0.3967	 0.1660
S	 0.4832	 0.0840
T	 0.4623	 0.1180



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Chain	Atom inclusion	Q-score
U	0.4163	0.0850
V	0.4051	0.1160
W	0.3308	0.0430
X	0.3329	0.0750
Y	0.1477	0.0260
Z	0.0441	-0.0080
a	0.8345	0.1690
b	0.4806	0.0860
c	0.4343	0.1150
d	0.8104	0.1230
e	0.5726	0.0600
f	0.5642	0.1240
g	0.2740	0.0540
h	0.4112	0.1200
i	0.5374	0.1230
j	0.4831	0.0970
k	0.4043	0.0760
l	0.4730	0.1080
m	0.4958	0.1650
n	0.3962	0.0630
o	0.3320	0.0950
p	0.3916	0.0600
q	0.3733	0.0550
r	0.2226	0.0860
s	0.4818	0.1030
t	0.2541	0.1020
u	0.4561	0.1060
v	0.4299	0.1080
w	0.5849	0.0980
x	0.5052	0.0500
y	0.3041	0.0980
z	0.5672	0.1230