



Full wwPDB EM Validation Report ⓘ

Oct 27, 2024 – 04:44 AM EDT

PDB ID : 6VYS
EMDB ID : EMD-21470
Title : Escherichia coli transcription-translation complex A1 (TTC-A1) containing a 21 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 : 2020-02-27
Resolution : 3.70 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

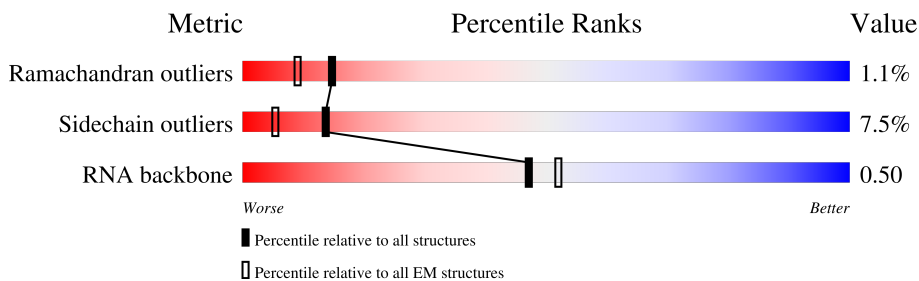
EMDB validation analysis : 0.0.1.dev113
MolProbity : 4.02b-467
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

1 Overall quality at a glance

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

The reported resolution of this entry is 3.70 Å.

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



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

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

Mol	Chain	Length	Quality of chain
1	0	103	
2	1	110	
3	2	100	
4	3	104	
5	4	94	
6	5	36	
7	6	36	
8	7	37	

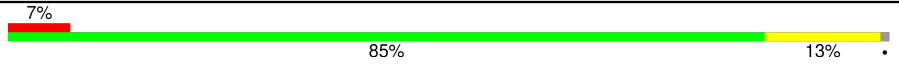
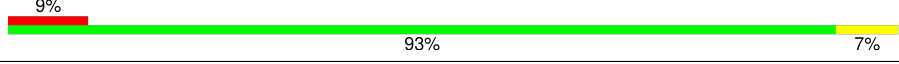
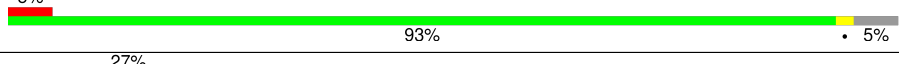

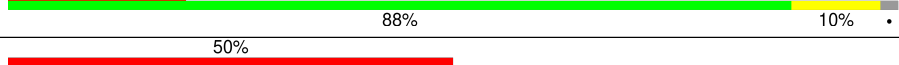

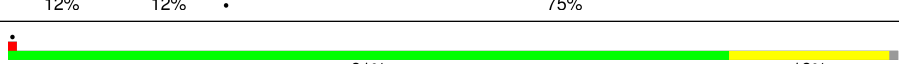
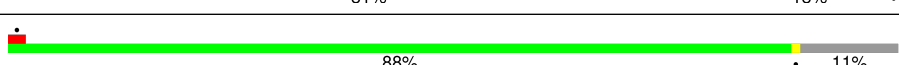
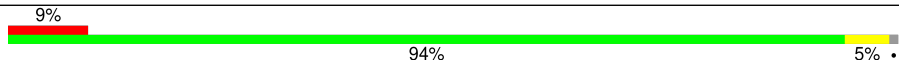

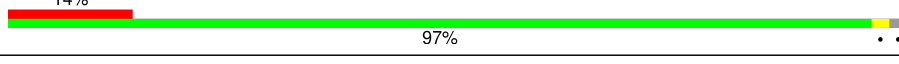
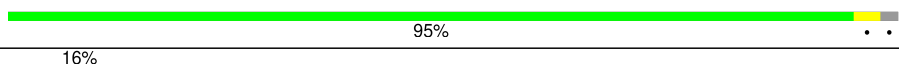
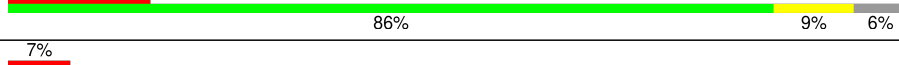
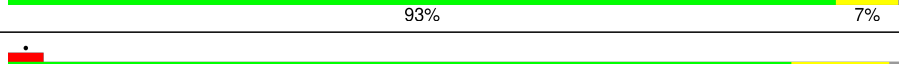
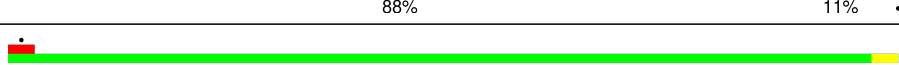
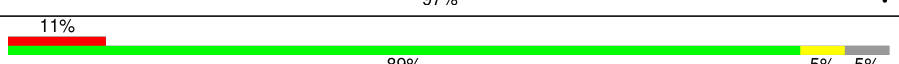
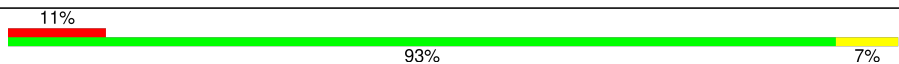
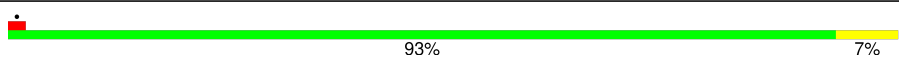
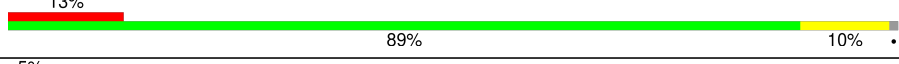
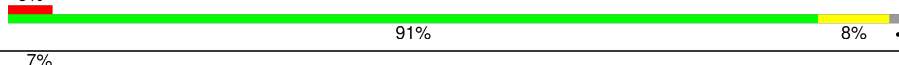
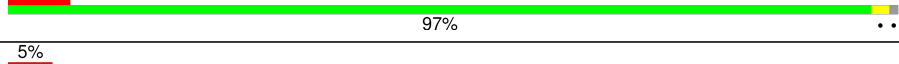
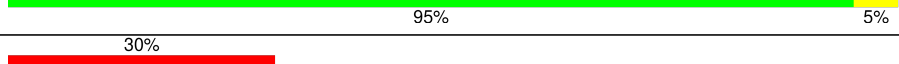
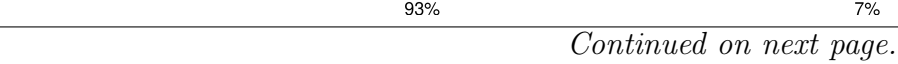


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Mol	Chain	Length	Quality of chain
9	9	165	
10	A	76	
10	B	76	
11	AA	1342	
12	AB	181	
13	AC	329	
13	AD	329	
14	AE	1358	
15	C	75	
16	D	1542	
17	E	87	
18	F	71	
19	G	241	
20	H	557	
21	I	233	
22	J	206	
23	K	167	
24	L	135	
25	M	179	
26	N	130	
27	O	130	
28	P	103	
29	Q	129	
30	R	124	
31	S	101	

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Mol	Chain	Length	Quality of chain
32	T	89	
33	U	82	
34	V	84	
35	W	92	
36	X	118	
37	Y	142	
38	Z	121	
39	a	2904	
40	b	85	
41	c	78	
42	d	120	
43	e	63	
44	f	59	
45	g	70	
46	h	273	
47	i	57	
48	j	209	
49	k	55	
50	l	201	
51	m	46	
52	n	179	
53	o	65	
54	p	177	
55	q	38	
56	r	149	

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Mol	Chain	Length	Quality of chain
57	s	142	 96% .
58	t	123	 6% 95% 5% .
59	u	144	 8% 96% .
60	v	136	 96% .
61	w	127	 18% 87% 6% 6% .
62	x	117	 18% 94% 5% .
63	y	115	 9% 95% . .
64	z	118	 97% . .

2 Entry composition [i](#)

There are 66 unique types of molecules in this entry. The entry contains 300543 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 21 nt long spacer.

Mol	Chain	Residues	Atoms						AltConf	Trace
8	7	26	Total	C	H	N	O	P	0	0
			644	244	97	82	195	26		

- 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.

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

- 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	variant	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			S
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	
			Total	C	H	N	O			S
53	o	64	1076	323	572	105	74	2	0	0

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

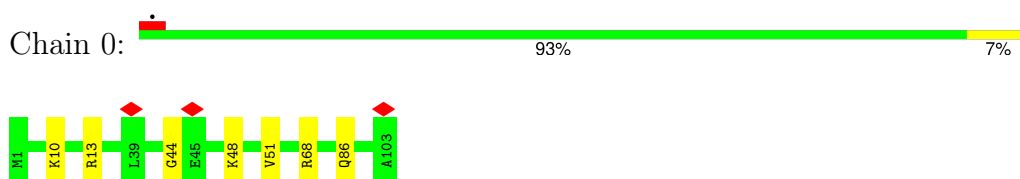
- Molecule 66 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

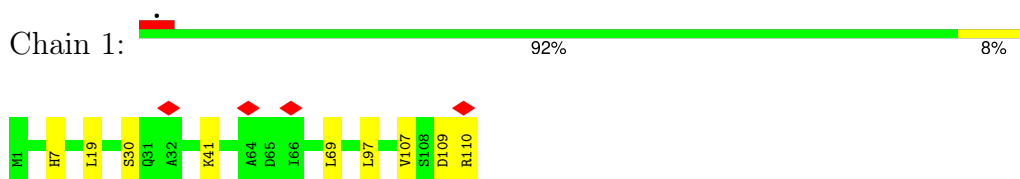
3 Residue-property plots [i](#)

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.

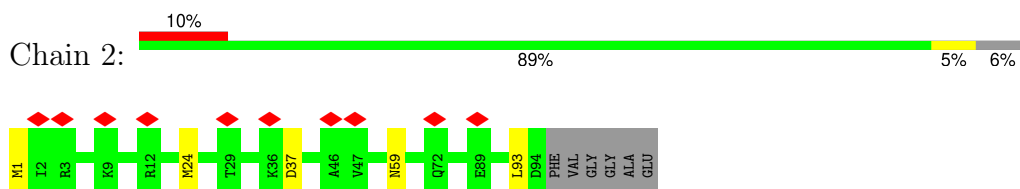
- Molecule 1: 50S ribosomal protein L21



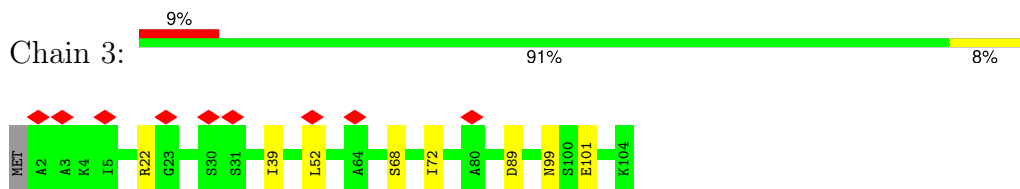
- Molecule 2: 50S ribosomal protein L22



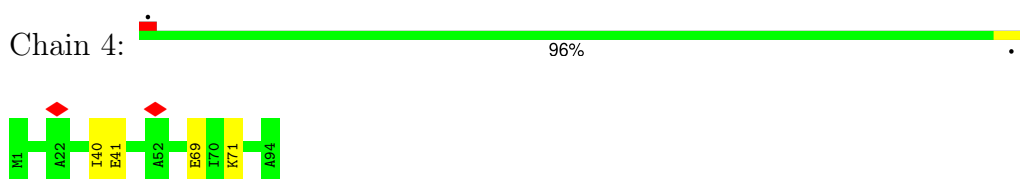
- Molecule 3: 50S ribosomal protein L23



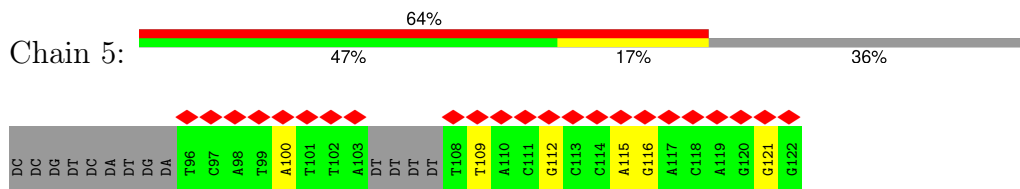
- Molecule 4: 50S ribosomal protein L24



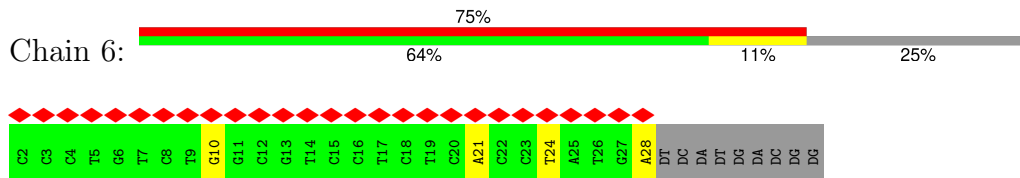
- Molecule 5: 50S ribosomal protein L25



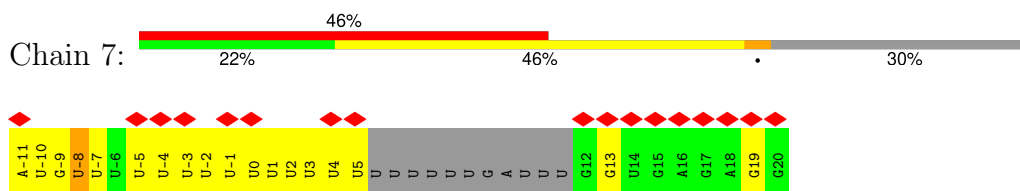
• Molecule 6: NT DNA



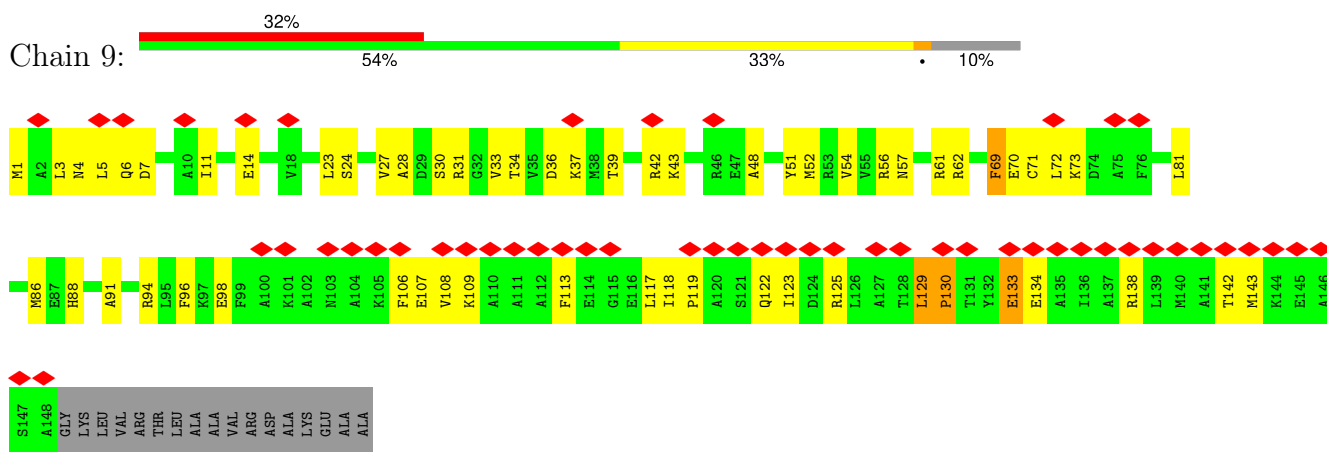
• Molecule 7: T DNA



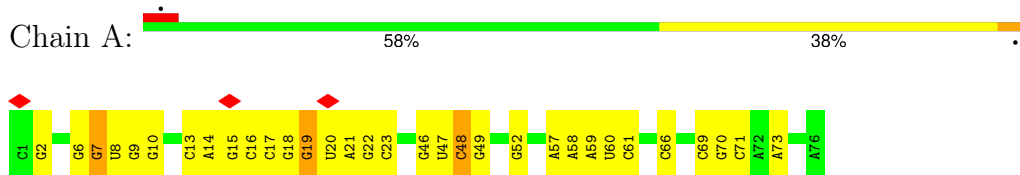
• Molecule 8: mRNA with 21 nt long spacer



• Molecule 9: 50S ribosomal protein L10

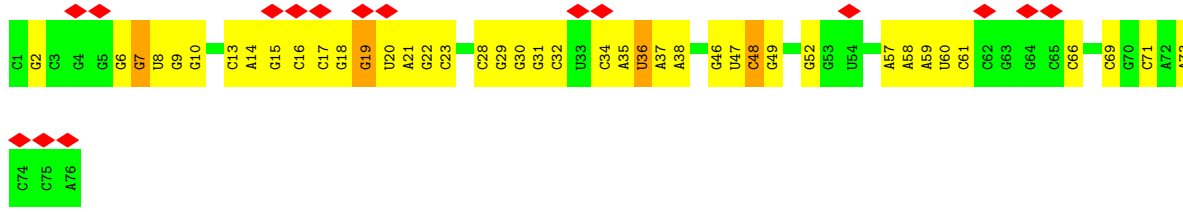


• Molecule 10: E-site and P-site tRNA (fMet)



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

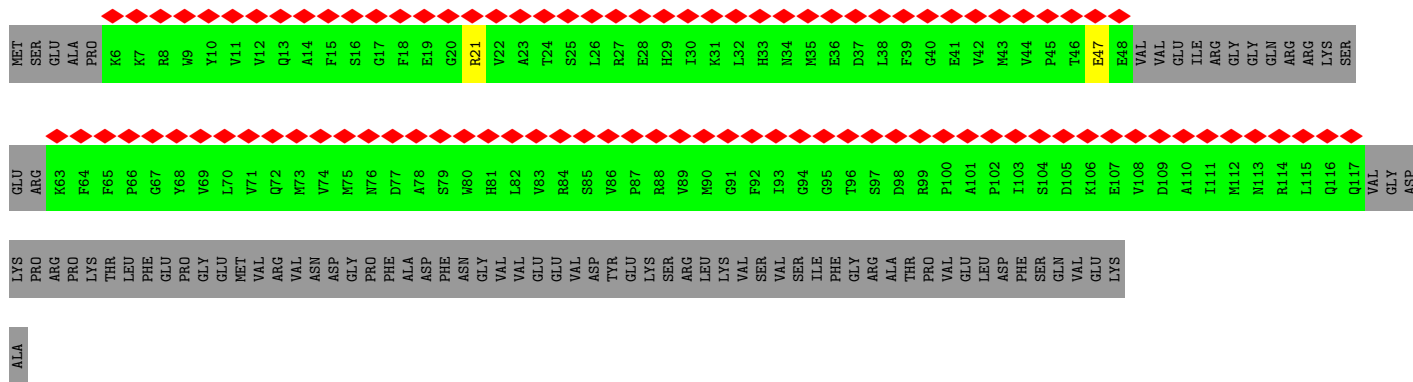




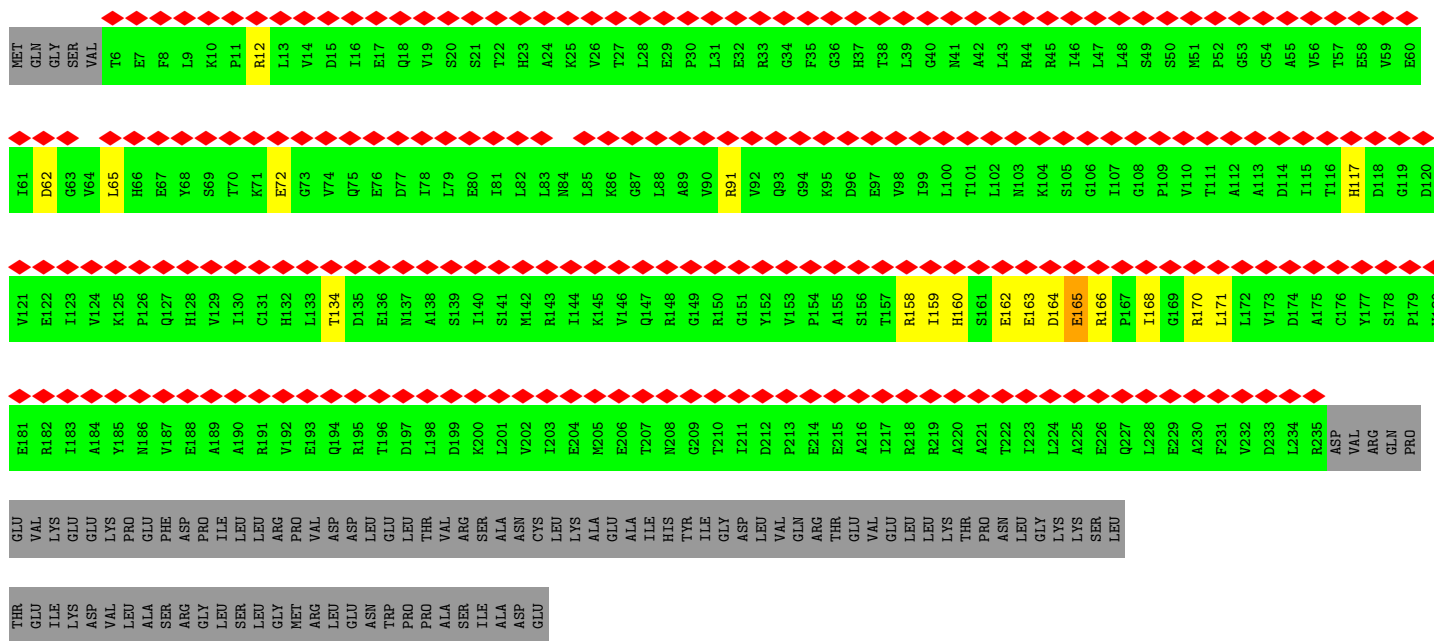
● Molecule 11: DNA-directed RNA polymerase subunit beta



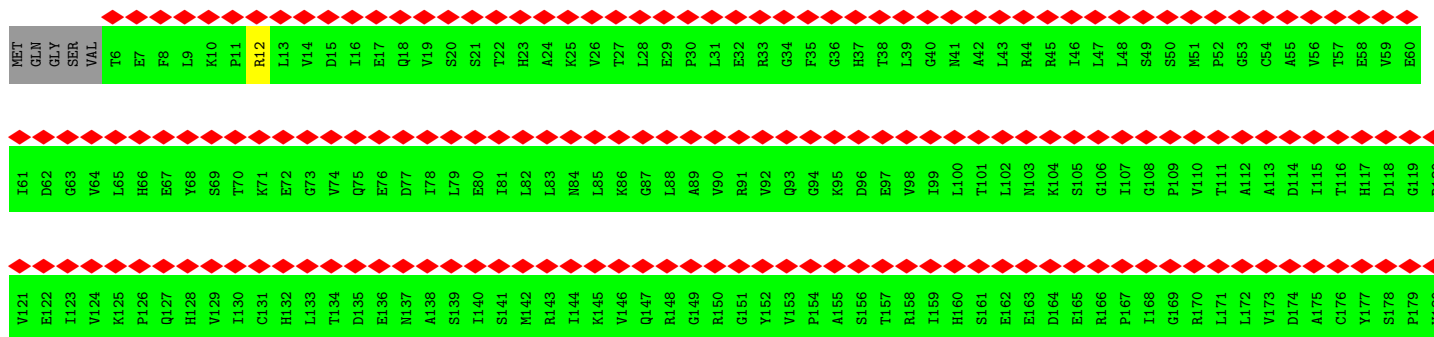
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S61	Y62	S63	G64	N65	S66	L68	Q69	Y70	V71	S72	Y73	R74	L75	G76	E77	P78	V79	F80	D81	Q82	Q83	E84	C85	Q86	I87	R88	G89	V90	T91	Y92	S93	A94	P95	L96	R97	V98	K99	L100	R101	L102	V103	I104	H105	E106	R107	E108	A109	P110	E111	G112	T113	V114	K115	L116	I117	K118	E119	Q120	
E121	Y122	Y123	M124	G125	E126	P128	L129	M130	T131	D132	M133	G134	T135	F136	V137	I138	D139	G140	T141	E142	R143	V144	I145	V146	S147	Q148	L149	H150	R151	S152	P153	G154	V155	F156	F157	D158	S159	D160	K161	G162	K163	T164	H165	E166	S167	G168	K169	P170	E171	Y172	M173	V174	R175	L176	I177	P178	Y179	R180	
G181	S182	L184	D185	F186	E187	F188	P189	P190	K191	D192	M193	L194	F195	V196	I197	L198	D199	R200	R201	R202	K203	L204	P205	A206	T207	I208	L209	L210	R211	A212	L213	N214	Y215	T216	T217	E218	Q219	I220	L221	D222	L223	F224	F225	E226	K227	V228	I229	F230	E231	I232	R233	D234	N235	K236	L237	Q238	M239	E240	
L241	V242	P243	E244	R245	L246	G248	E249	T250	A251	S252	F253	D254	I255	E256	A257	N258	G259	K260	V261	S262	V263	E264	K265	G266	R267	R268	I269	T270	A271	R272	H273	I274	R275	Q276	L277	E278	K279	D280	L281	R282	K283	L284	I285	E286	V287	P288	V289	E290	Y291	I292	A293	G294	K295	V296	V297	A298	K299	D300	
Y301	I302	D303	E304	S305	T306	E308	L309	I310	C311	A312	A313	N314	M315	E316	L317	S318	L319	D320	L321	L322	A323	K324	L325	S326	Q327	S328	G329	H330	K331	R332	I333	E334	T335	L336	F337	T338	N339	D340	L341	R342	H343	G344	P345	Y346	L347	S348	E349	V350	L351	R352	V353	A354	P355	T356	N357	G358	R359	L360	
S361	A362	L363	V364	E365	I366	R368	M369	M370	R371	P372	G373	E374	P375	P376	T377	R378	E379	A380	A381	E382	S383	L384	F385	E386	N387	L388	F389	F390	S391	D392	D393	R394	Y395	D396	L397	S398	A399	V400	G401	R402	M403	K404	F405	M406	R407	S408	L409	L410	R411	E412	E413	I414	E415	G416	S417	G418	I419	L420	
S421	K422	D423	D424	I425	I426	V428	M429	K430	K431	L432	I433	D434	I435	R436	M437	G438	K439	G440	E441	V442	D443	D444	I445	H447	L448	G449	M450	R451	R452	I453	R454	S455	V456	G457	E458	M459	A460	E461	N462	Q463	F464	R465	V466	G467	L468	V469	R470	V471	E472	R473	A474	V475	K476	E477	R478	L479	S480		
L481	G482	D483	L484	D485	T486	M488	P489	Q490	D491	M492	I493	M494	A495	K496	P497	I498	S499	A500	A501	V502	K503	E504	F505	G507	S508	S509	Q510	L511	S512	Q513	F514	M515	D516	Q517	N518	N519	P520	L521	S522	E523	I524	T525	H526	K527	R528	R529	I530	S531	A532	L533	G534	P535	G536	G537	L538	T539	R540		
E541	R542	A543	G544	F545	E546	R548	D549	V550	H551	P552	T553	H554	Y555	G556	R557	V558	C559	P560	I561	E562	T563	P564	E565	G566	P567	N568	I569	G570	L571	I572	N573	S574	L575	S576	V577	Y578	A579	Q580	T581	N582	E583	Y584	G585	F586	L587	E588	T589	P590	Y591	R592	K593	V594	T595	D596	G597	V598	V599	T600	
D601	E602	I603	H604	Y605	L606	S607	A608	I609	E610	E611	G612	N613	Y614	V615	I616	A617	Q618	A619	N620	S621	N622	L623	D624	E625	E626	G627	H628	F629	V630	E631	D632	L633	V634	T635	C636	R637	S638	K639	G640	E641	S642	S643	L644	F645	S646	R647	D648	Q649	V650	D651	Y652	M653	D654	V655	S656	P657	Q658	Q659	V660



• Molecule 13: DNA-directed RNA polymerase subunit alpha



• Molecule 13: DNA-directed RNA polymerase subunit alpha

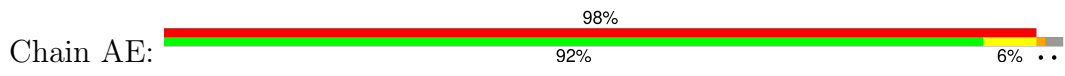


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GLU	VAL	LYS	GLY	LYS	PRO	PHE	ASP	PRO	ILE	LEU	ARG	PRO	VAL	ASP	ASP	LEU	GLY	TRP	GLU	PRO	THR	VAL	ARG	SER	ALA	ALA	ILE	HIS	TVR	ILE	GLY	ASP	VAL	GLN	ARG	THR	VAL	GLY	LEU	LEU	LYS	THR	PRO	ASN	LEU	GLY	LYS	LYS	SER	LEU
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THR	GLU	ILE	LYS	ASP	VAL	LEU	ALA	SER	ARG	GLY	LEU	LEU	LEU	LEU	ASP	ASP	ASP	GLU	ASN	TRP	PRO	PRO	THR	VAL	ALA	SER	ILE	ALA	ALA	ASP	GLU
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● Molecule 14: DNA-directed RNA polymerase subunit



E16	F17	D18	A19	K21	I22	A23	L24	A25	S26	P27	D28	M29	I30	R31	S32	W33	S34	F35	G36	V38	K39	P40	K41	E42	T43	I44	M45	Y46	R47	T48	F49	K50	P51	E52	R53	D54	G55	L56	F57	C58	L59	A60	I61	F62	G63	P64	V65	K66	D67	E68	E69	C70	L71	C72	G73	K74	Y75
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K76	R77	L78	K79	H80	R81	G82	V83	I84	C85	E86	K87	C88	G89	V90	E91	T93	Q94	T95	K96	R97	R98	R99	E100	R101	M102	G103	H104	I105	E106	L107	A108	S109	P110	T111	A112	H113	I114	W115	F116	L117	K118	S119	L120	P121	S122	R123	I124	G125	L126	L127	D128	M130	L131	L132	R133	D134	I135
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E136	R137	V138	L139	F141	E142	S143	I144	Y145	V146	I147	E148	G149	G150	M151	N152	M153	L154	E155	R156	Q157	Q158	I159	L160	T161	E162	E163	Q164	Y165	L166	D167	A168	L169	E170	E171	F172	G173	D174	E175	F176	D177	A178	K179	M180	G181	A182	E183	A184	I185	Q186	A187	L188	L189	K190	S191	M192	D193	L194	E195
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I316	T317	G318	S319	N320	K321	R322	P323	L324	K325	S326	L327	A328	O329	M330	I331	K332	G333	K334	Q335	G336	R337	F338	R339	Q340	N341	L342	L343	G344	R346	V347	D348	Y349	S350	G351	R352	S353	V354	I355	T356	V357	G358	P359	Y360	L361	R362	H364	Q365	C366	L368	P369	K370	K371	M372	A373	L374	E375
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L376	F377	K378	P379	L381	Y382	G383	K384	L385	E386	L387	R388	G389	L390	A391	T392	T393	L394	K395	A396	A397	K398	K399	M400	V401	E402	R403	G404	E405	A406	V407	V408	W409	D410	T411	L412	S413	E414	V415	I416	R417	E418	H419	P420	V421	L422	L423	N424	M425	A426	S427	T428	L429	N430	H430	R431	L432	G433	T434	Q435
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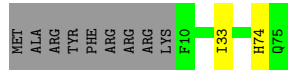
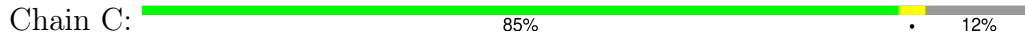
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G496	E497	P498	L499	I500	V501	P502	S503	Q504	D505	V506	V507	L508	O509	L510	V511	L512	M513	T514	R515	D516	C517	V518	N519	A520	K521	G522	E523	G524	M525	V526	L527	V528	W529	P530	K531	E532	L533	E534	R535	L536	V537	R538	S539	G540	A541	A542	S543	L544	H545	A546	R547	N548	Y549	V550	R551	L552	T553	E554	Y555
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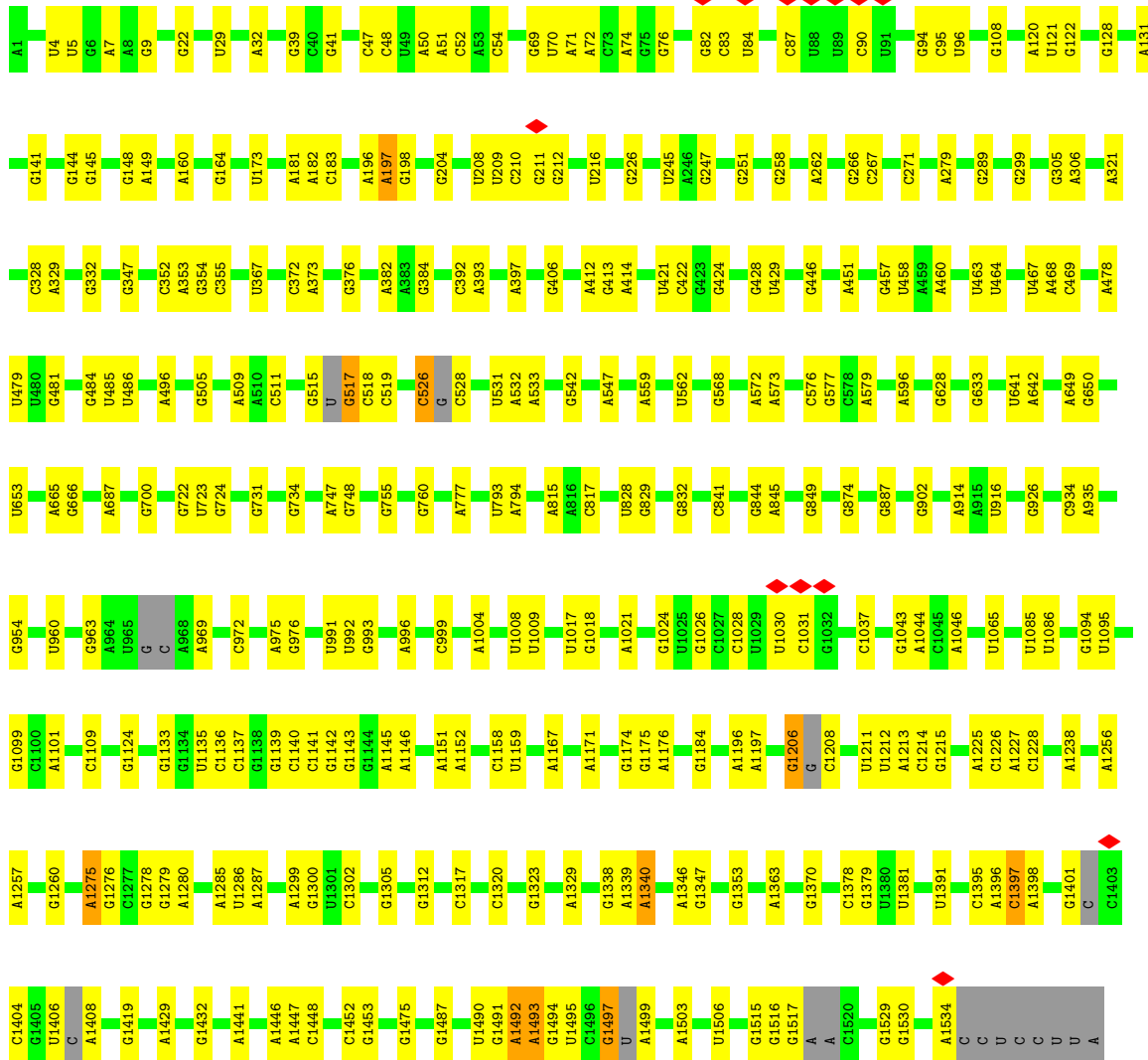
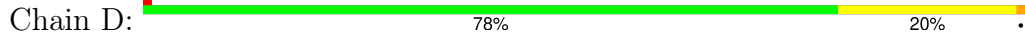
E556	K557	D558	A559	N560	G561	L563	V564	A565	K566	T567	S568	L569	K570	D571	T572	T573	V574	G575	R576	A577	L578	L579	M580	M581	L582	V583	P584	K585	G586	L587	F588	S589	I591	V592	N593	Q594	A595	L596	G597	K598	K599	A600	T601	S602	K603	L604	L605	M606	T607	C608	R610	L611	L612	G613	L614	K615
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P616	P617	V618	I619	F620	A621	Q623	I624	M625	Y626	T627	G628	F629	A630	Y631	A632	A633	R634	S635	G636	A637	S638	V639	G640	I641	D642	D643	M644	V645	I646	P647	E648	K649	K650	H651	E652	I653	I654	S655	E656	A657	E658	A659	E660	A662	E663	I664	Q665	E666	Q667	F668	G669	S670	G671	L672	S673	T674	A675				
G677	E678	Y679	N680	K681	V682	I683	D684	I685	V686	A687	A688	A689	N690	D691	R692	V693	S694	K695	A696	M697	M698	D699	N700	L701	Q702	T703	V704	T705	V706	I707	N708	R709	D710	G711	Q712	E713	E714	K715	Q716	V717	S718	F719	N720	S721	I722	Y723	M724	A725	A726	D727	S728	G729	A730	R731	G732	A733	A734	A735			
Q736	I737	R738	Q739	L740	A741	G742	M743	G744	L746	M747	A748	K749	P750	D751	G752	S753	I754	I755	E756	T757	P758	I759	T760	A761	N762	F763	A764	E765	G766	L767	N768	V769	L770	Q771	E772	F773	I774	S775	T776	H777	G778	A779	R780	K781	G782	L783	A784	D785	T786	L787	K788	G789	T790	A791	N792	S793	G794	Y795			
L796	T797	R798	R799	L800	V801	V803	A804	Q805	D806	L807	V808	V809	T810	E811	D812	D813	C814	G815	T816	H817	E818	G819	I820	M821	M822	T823	P824	V825	I826	E827	G828	G829	D830	V831	K832	E833	F773	P834	L835	R836	D837	R838	V839	L840	R841	G842	V843	T844	A845	E846	D847	V848	L849	K850	P851	G852	S853	A854	D855		
I856	L857	V858	P859	N860	N861	T862	L863	L864	E866	Q867	F868	C869	D870	L871	L872	E873	E874	N875	S876	V877	D878	A879	V880	I881	M882	R883	S884	V885	V886	S887	C888	R889	T890	D891	F892	G893	V894	C895	A896	H897	C898	Y899	G900	R901	D902	L903	A904	R905	G906	H907	I908	I909	N910	K911	G912	E913	A914	I915			
G916	V917	I918	A919	A920	Q921	S922	I923	G924	E925	P926	G927	T928	Q929	L930	T931	M932	R933	THR	PHE	HIS	ILE	GLY	GLY	ALA	ALA	ALA	SER	ARG	ALA	ALA	ALA	ALA	GLU	S948	S949	I950	Q951	V952	K953	N954	K955	G956	S957	I958	K959	L960	S961	N962	V963	K964	S965	V966	V967	N968	S969	S970	G971	K972	I973	V974	I975
T976	S977	R978	N979	T980	E981	L982	K983	L984	D986	E987	F988	G989	R990	T991	K992	E993	S994	Y995	K996	V997	P998	Y999	G1000	A1001	V1002	L1003	A1004	K1005	G1006	D1007	G1008	E1009	Q1010	V1011	A1012	G1013	G1014	E1015	T1016	L1017	A1018	M1019	M1020	D1021	P1022	H1023	T1024	M1025	P1026	V1027	I1028	I1029	E1030	V1031	S1032	G1033	F1034	V1035			
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P1096	A1097	Q1098	Y1099	F1100	L1101	P1102	G1103	K1104	A1105	I1106	V1107	L1108	L1109	E1110	D1111	G1112	V1113	Q1114	I1115	S1116	S1117	G1118	D1119	T1120	A1121	A1122	R1123	I1124	P1125	Q1126	GLU	SER	GLY	GLY	THR	LYS	ASP	ILE	THR	G1136	G1137	L1138	P1139	R1140	V1141	A1142	D1143	L1144	F1145	E1146	A1147	R1148	R1149	P1150	K1151	E1152	P1153	A1154	I1155		
L1156	A1157	E1158	I1159	S1160	G1161	V1163	S1164	F1165	G1166	K1167	L1168	T1169	K1170	G1171	K1172	R1173	R1174	L1175	V1176	I1177	T1178	P1179	V1180	D1181	G1182	S1183	D1184	P1185	Y1186	E1187	E1188	M1189	I1190	P1191	K1192	V1193	R1194	Q1195	L1196	M1197	V1198	F1199	E1200	G1201	E1202	R1203	V1204	E1205	R1206	G1207	D1208	I1209	I1210	S1211	D1212	G1213	P1214	E1215			
A1216	P1217	H1218	D1219	L1220	L1221	L1223	R1224	G1225	V1226	H1227	A1228	V1229	T1230	R1231	Y1232	I1233	V1234	M1235	E1236	V1237	Q1238	D1239	V1240	Y1241	R1242	L1243	Q1244	G1245	V1246	K1247	I1248	N1249	D1250	K1251	H1252	I1253	E1254	V1255	I1256	V1257	R1258	Q1259	M1260	L1261	R1262	K1263	A1264	T1265	I1266	V1267	N1268	I1269	I1270	S1271	S1272	L1273	F1274	L1275			
E1276	G1277	E1278	Q1279	V1280	E1281	S1283	L1284	V1285	K1286	I1287	A1288	M1289	R1290	E1291	L1292	E1293	A1294	M1295	G1296	K1297	V1298	G1299	A1300	T1301	Y1302	S1303	R1304	D1305	L1306	L1307	I1308	I1309	T1310	K1311	A1312	S1313	L1314	A1315	T1316	E1317	S1318	F1319	I1320	S1321	A1322	S1323	S1324	F1325	Q1326	E1327	T1328	L1329	R1330	V1331	L1332	T1333	E1334	A1335			
A1336	V1337	A1338	G1339	K1340	R1341	D1342	E1343	L1344	R1345	G1346	L1347	K1348	E1349	N1350	V1351	I1352	V1353	G1354	R1355	L1356	I1357	P1358	A1359	G1360	T1361	G1362	Y1363	A1364	Y1365	H1366	Q1367	D1368	I1369	M1370	R1371	R1372	R1373	A1315	A1316	A1317	A1318	A1319	A1320	A1321	A1322	A1323	A1324	A1325	A1326	A1327	A1328	A1329	A1330	A1331	A1332	A1333	A1334	A1335			

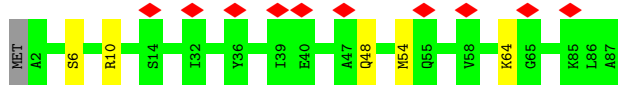
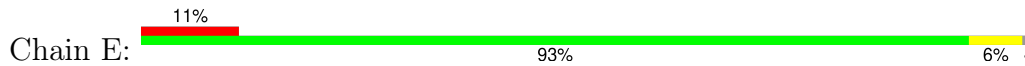
• Molecule 15: 30S ribosomal protein S18



• Molecule 16: 16S rRNA

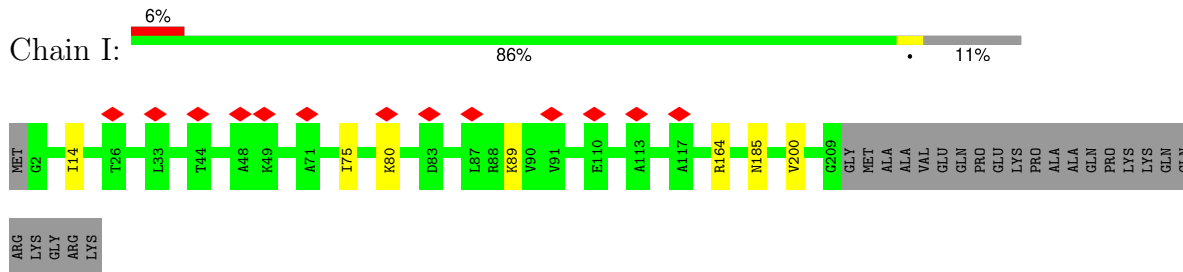


• Molecule 17: 30S ribosomal protein S20

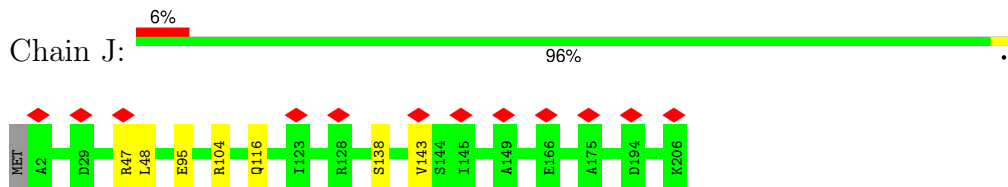


• Molecule 18: 30S ribosomal protein S21

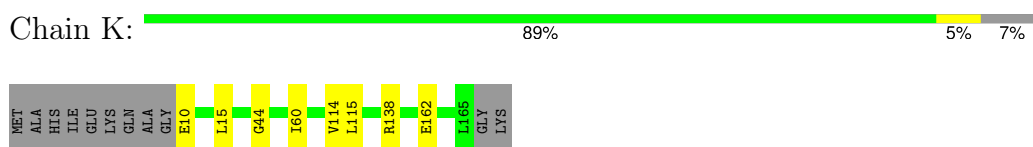
• Molecule 21: 30S ribosomal protein S3



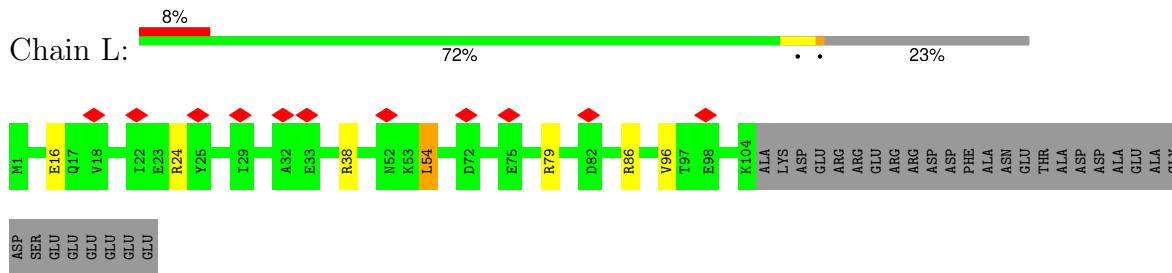
• Molecule 22: 30S ribosomal protein S4



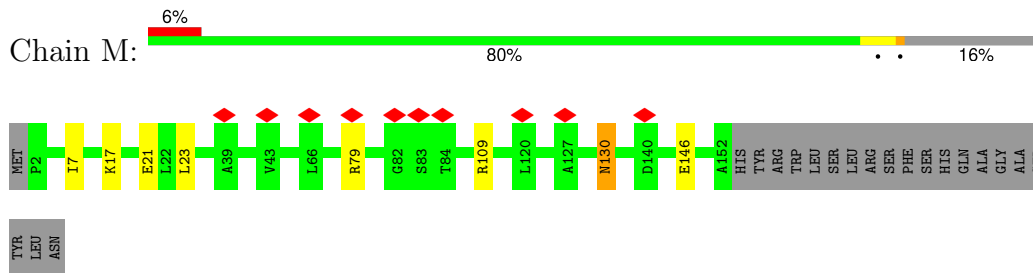
• Molecule 23: 30S ribosomal protein S5



• Molecule 24: 30S ribosomal protein S6

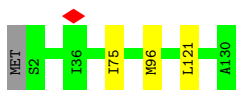


• Molecule 25: 30S ribosomal protein S7

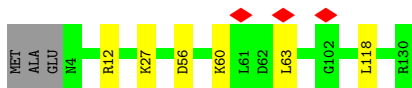


• Molecule 26: 30S ribosomal protein S8

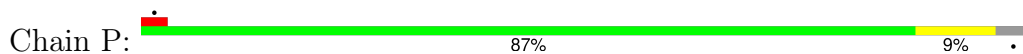




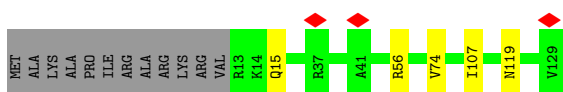
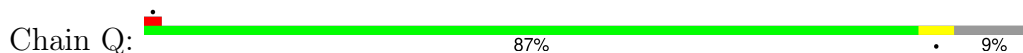
- Molecule 27: 30S ribosomal protein S9



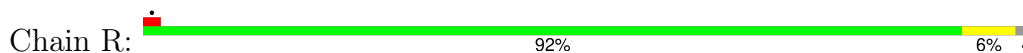
- Molecule 28: 30S ribosomal protein S10



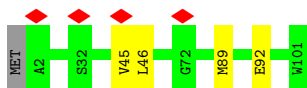
- Molecule 29: 30S ribosomal protein S11



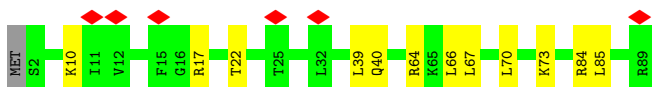
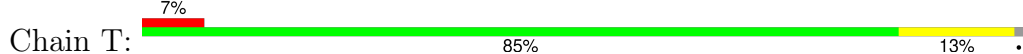
- Molecule 30: 30S ribosomal protein S12



- Molecule 31: 30S ribosomal protein S14

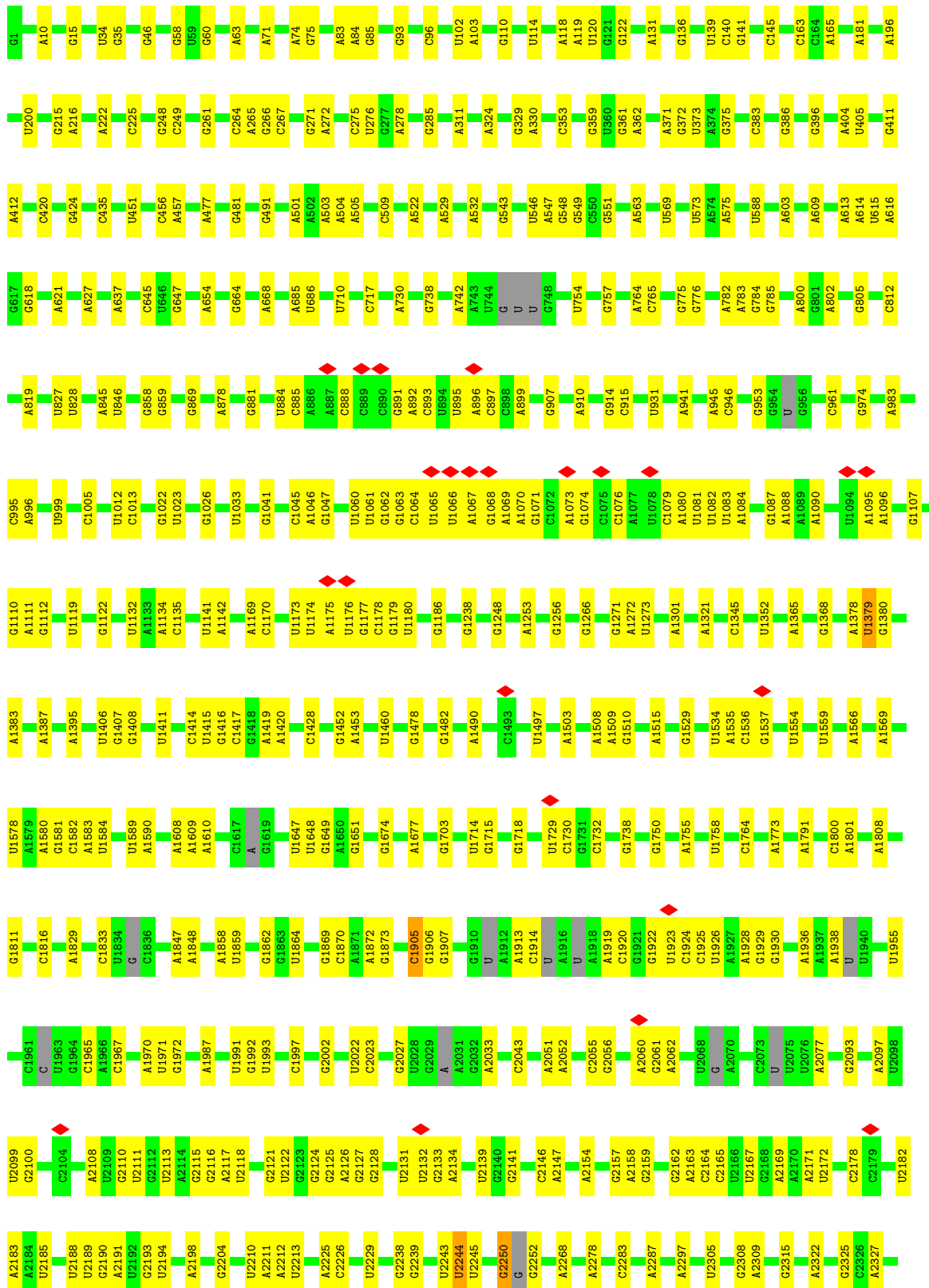
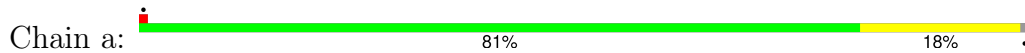


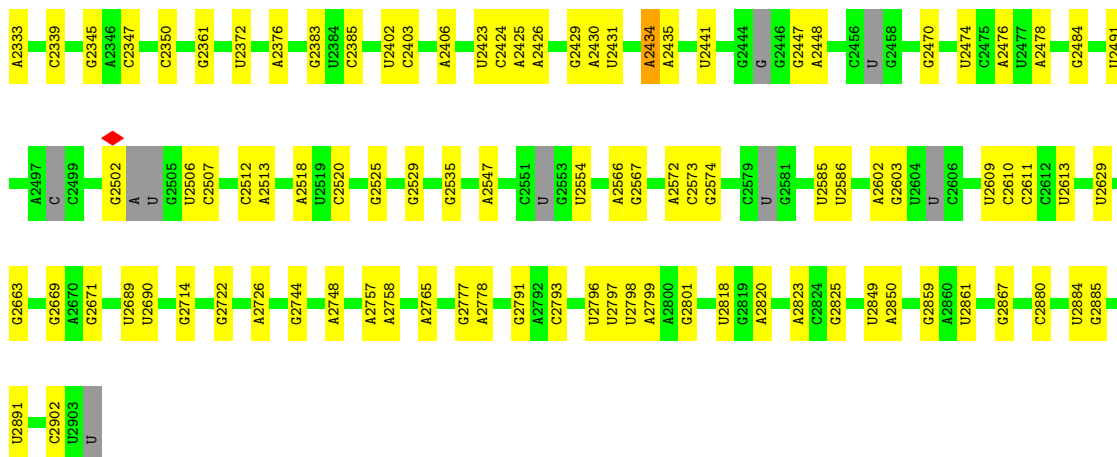
- Molecule 32: 30S ribosomal protein S15



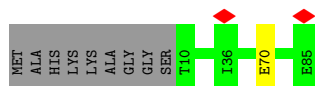
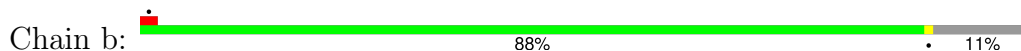
- Molecule 33: 30S ribosomal protein S16

• Molecule 39: 23S rRNA

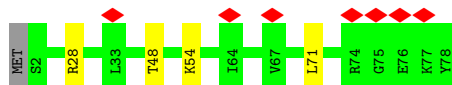
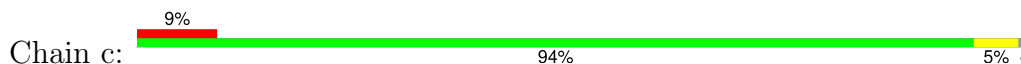




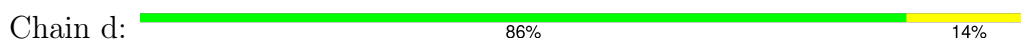
• Molecule 40: 50S ribosomal protein L27



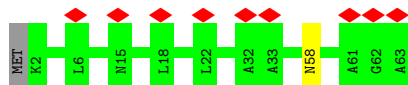
• Molecule 41: 50S ribosomal protein L28



• Molecule 42: 5S rRNA



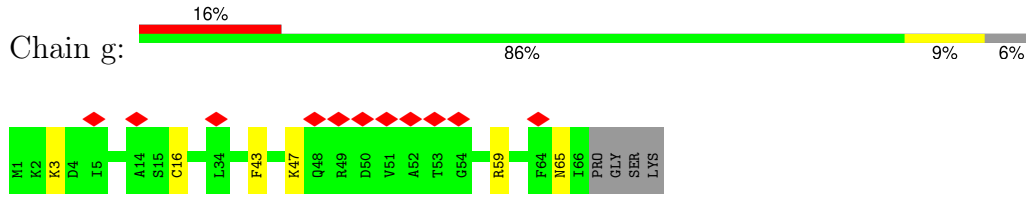
• Molecule 43: 50S ribosomal protein L29



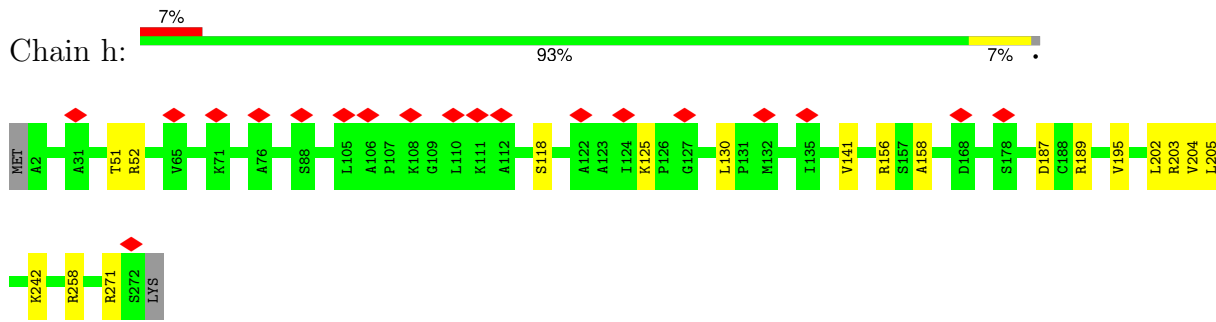
• Molecule 44: 50S ribosomal protein L30



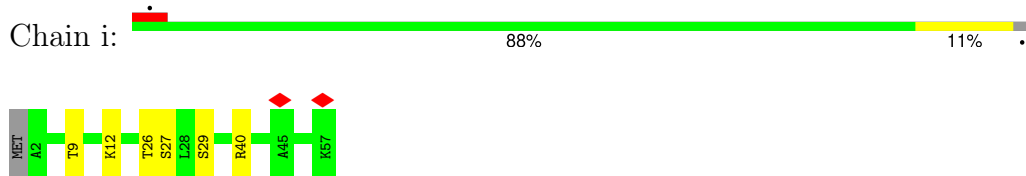
- Molecule 45: 50S ribosomal protein L31



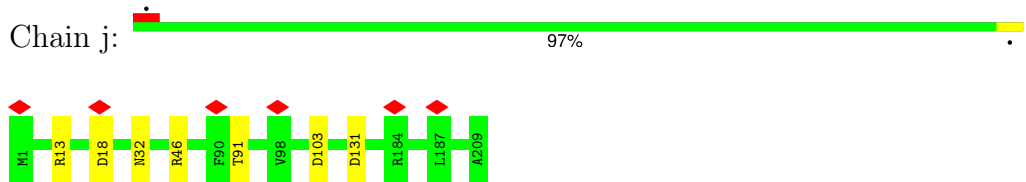
- Molecule 46: 50S ribosomal protein L2



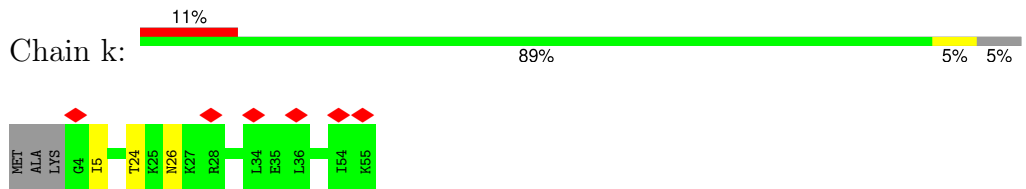
- Molecule 47: 50S ribosomal protein L32



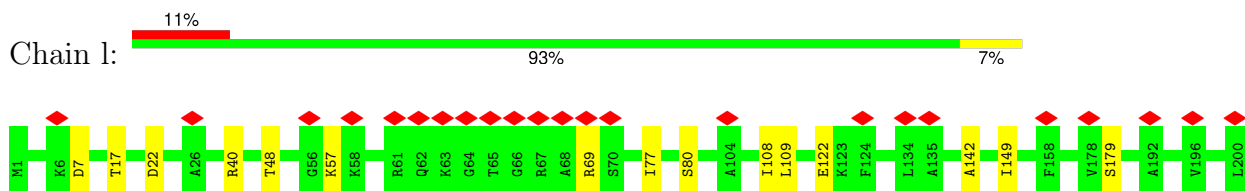
- Molecule 48: 50S ribosomal protein L3



- Molecule 49: 50S ribosomal protein L33



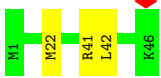
- Molecule 50: 50S ribosomal protein L4




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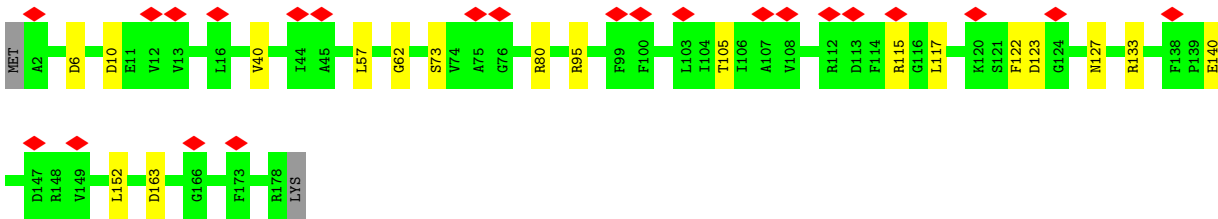
- Molecule 51: 50S ribosomal protein L34

Chain m:  93% 7%



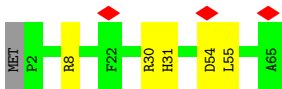
- Molecule 52: 50S ribosomal protein L5

Chain n:  13% 89% 10%



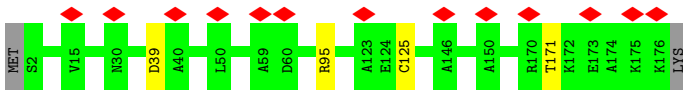
- Molecule 53: 50S ribosomal protein L35

Chain o:  5% 91% 8%



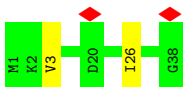
- Molecule 54: 50S ribosomal protein L6

Chain p:  7% 97%

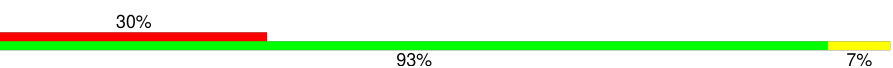


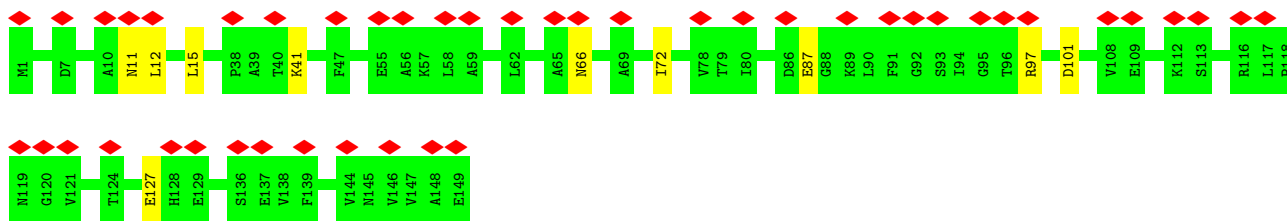
- Molecule 55: 50S ribosomal protein L36

Chain q:  5% 95% 5%



- Molecule 56: 50S ribosomal protein L9

Chain r:  30% 93% 7%



- Molecule 57: 50S ribosomal protein L13



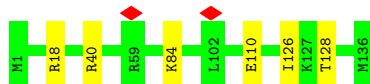
- Molecule 58: 50S ribosomal protein L14



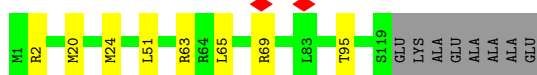
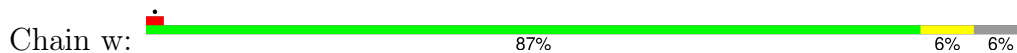
- Molecule 59: 50S ribosomal protein L15



- Molecule 60: 50S ribosomal protein L16

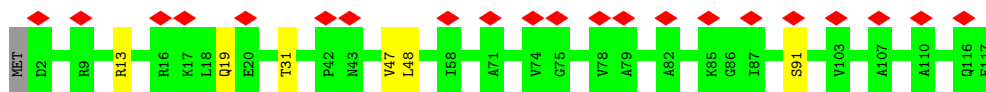


- Molecule 61: 50S ribosomal protein L17

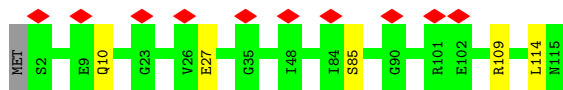


- Molecule 62: 50S ribosomal protein L18





- 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	29704	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	0.042	Depositor
Minimum map value	-0.010	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.00868	Depositor
Map size (Å)	520.0, 520.0, 520.0	wwPDB
Map dimensions	500, 500, 500	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.04, 1.04, 1.04	Depositor

5 Model quality i

5.1 Standard geometry i

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	0	0.38	0/829	0.67	0/1107
2	1	0.48	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	0.41	0/766	0.68	0/1025
6	5	1.13	6/528 (1.1%)	0.97	1/810 (0.1%)
7	6	1.11	4/603 (0.7%)	0.96	0/926
8	7	0.62	2/607 (0.3%)	0.93	3/940 (0.3%)
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	0.40	0/1789	0.57	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	0.35	0/952	0.74	0/1274

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
31	S	0.50	0/817	0.79	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	0.86	0/1215
37	Y	0.67	0/1046	0.59	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	0.71	0/779
41	c	0.48	0/635	0.81	1/848 (0.1%)
42	d	0.30	0/2872	0.70	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	0.64	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	0.45	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	0.44	0/1122	0.69	0/1515
57	s	0.50	0/1152	0.76	0/1551
58	t	0.41	0/955	0.78	0/1279
59	u	0.40	0/1062	0.75	0/1413
60	v	0.47	0/1093	0.81	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	0.72	1/1242 (0.1%)
64	z	0.60	0/960	0.92	0/1278
All	All	0.43	34/189040 (0.0%)	0.74	102/278616 (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	13.78	1.70	1.47
16	D	1516	G	O3'-P	-13.54	1.44	1.61
16	D	1339	A	O3'-P	10.62	1.73	1.61
11	AA	374	GLU	C-N	10.48	1.54	1.34
14	AE	88	CYS	CB-SG	-10.15	1.65	1.82
6	5	109	DT	O3'-P	8.69	1.71	1.61
16	D	145	G	O3'-P	8.39	1.71	1.61
7	6	10	DG	C1'-N9	-8.28	1.35	1.47
16	D	196	A	O3'-P	8.28	1.71	1.61
11	AA	850	ILE	N-CA	-8.22	1.29	1.46
16	D	1275	A	O3'-P	7.75	1.70	1.61
20	H	169	SER	N-CA	7.54	1.61	1.46
39	a	2434	A	O3'-P	7.53	1.70	1.61
16	D	1395	C	O3'-P	7.29	1.69	1.61
16	D	1515	G	O3'-P	-7.29	1.52	1.61
6	5	121	DG	C1'-N9	-7.24	1.37	1.47
8	7	19	G	C1'-N9	-7.19	1.36	1.46
8	7	-10	U	C1'-N1	6.97	1.59	1.48
16	D	1490	U	O3'-P	6.78	1.69	1.61
6	5	112	DG	C1'-N9	-6.68	1.37	1.47
16	D	1492	A	O3'-P	6.57	1.69	1.61
39	a	1905	C	O3'-P	6.53	1.69	1.61
6	5	100	DA	C1'-N9	-6.52	1.38	1.47
39	a	2167	U	O3'-P	6.43	1.68	1.61
7	6	21	DA	C1'-N9	-6.41	1.38	1.47
14	AE	93	THR	CA-C	6.18	1.69	1.52
9	9	129	LEU	C-N	6.11	1.45	1.34
6	5	116	DG	C1'-N9	-6.08	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	-5.76	1.39	1.47
10	B	36	U	O3'-P	5.75	1.68	1.61

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	D	1397	C	O3'-P	5.67	1.68	1.61
7	6	24	DT	C1'-N1	5.28	1.56	1.49

All (102) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	D	1516	G	P-O3'-C3'	-18.95	96.97	119.70
16	D	1516	G	O3'-P-O5'	13.80	130.22	104.00
11	AA	1250	SER	C-N-CA	11.15	149.59	121.70
39	a	2252	G	N9-C1'-C2'	-10.92	99.81	114.00
16	D	1401	G	N9-C1'-C2'	-10.66	100.14	114.00
52	n	73	SER	N-CA-CB	-10.60	94.61	110.50
16	D	1499	A	N9-C1'-C2'	-10.35	100.55	114.00
16	D	528	C	N1-C1'-C2'	-10.21	100.73	114.00
20	H	169	SER	N-CA-C	9.97	137.91	111.00
16	D	1339	A	P-O3'-C3'	9.84	131.51	119.70
10	B	29	G	N9-C1'-C2'	-9.75	101.28	112.00
10	B	28	C	P-O3'-C3'	9.60	131.22	119.70
16	D	196	A	P-O3'-C3'	9.42	131.00	119.70
14	AE	271	ARG	NE-CZ-NH2	-9.32	115.64	120.30
11	AA	375	PRO	CA-N-CD	-9.23	98.58	111.50
16	D	526	C	N1-C1'-C2'	-8.80	102.31	112.00
20	H	88	LYS	C-N-CA	8.76	143.61	121.70
39	a	2167	U	P-O3'-C3'	8.63	130.05	119.70
16	D	1208	C	N1-C1'-C2'	-8.55	102.60	112.00
16	D	1206	G	N9-C1'-C2'	-8.39	102.77	112.00
39	a	2434	A	P-O3'-C3'	8.29	129.65	119.70
9	9	130	PRO	CA-N-CD	-8.26	99.94	111.50
11	AA	995	ASP	O-C-N	-8.24	109.52	122.70
11	AA	376	PRO	N-CA-CB	-8.07	93.61	103.30
16	D	1406	U	N1-C1'-C2'	-7.77	103.45	112.00
39	a	1905	C	P-O3'-C3'	7.70	128.94	119.70
16	D	1275	A	P-O3'-C3'	7.60	128.82	119.70
16	D	1492	A	P-O3'-C3'	7.59	128.81	119.70
16	D	1490	U	P-O3'-C3'	7.56	128.78	119.70
20	H	305	HIS	N-CA-C	7.45	131.10	111.00
10	B	29	G	C3'-C2'-O2'	7.36	134.64	113.30
8	7	-11	A	OP2-P-O3'	7.23	121.11	105.20
16	D	1206	G	C4'-C3'-O3'	7.17	127.34	113.00
16	D	1493	A	C2'-C3'-O3'	7.11	125.15	109.50
10	B	35	A	P-O3'-C3'	7.11	128.23	119.70
39	a	2245	U	N1-C1'-C2'	-7.02	104.28	112.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
16	D	145	G	P-O3'-C3'	7.02	128.12	119.70
16	D	1516	G	OP1-P-O3'	-6.97	89.87	105.20
16	D	1395	C	P-O3'-C3'	6.97	128.06	119.70
11	AA	855	PRO	N-CA-CB	-6.84	95.07	102.60
8	7	-11	A	O3'-P-O5'	-6.78	91.11	104.00
52	n	73	SER	CB-CA-C	6.74	122.90	110.10
11	AA	995	ASP	CA-C-N	6.70	131.95	117.20
16	D	1401	G	C4'-C3'-O3'	6.67	126.34	113.00
16	D	1515	G	O3'-P-O5'	-6.66	91.34	104.00
39	a	2243	U	N1-C1'-C2'	-6.58	104.77	112.00
39	a	2250	G	C4'-C3'-O3'	-6.58	95.59	109.40
39	a	1379	U	C2'-C3'-O3'	6.55	124.18	113.70
11	AA	935	THR	CA-CB-OG1	-6.48	95.40	109.00
20	H	339	ARG	C-N-CA	6.46	137.86	121.70
16	D	1515	G	P-O3'-C3'	6.44	127.43	119.70
16	D	1408	A	N9-C1'-C2'	-6.42	104.94	112.00
16	D	1497	G	N9-C1'-C2'	-6.38	104.98	112.00
16	D	515	G	N9-C1'-C2'	-6.37	104.99	112.00
6	5	109	DT	P-O3'-C3'	6.35	127.32	119.70
10	B	34	C	P-O3'-C3'	6.33	127.29	119.70
13	AC	117	HIS	CB-CA-C	-6.21	97.97	110.40
11	AA	849	GLU	C-N-CA	6.15	137.09	121.70
11	AA	1004	ASP	CB-CA-C	5.97	122.35	110.40
11	AA	943	LYS	CA-C-O	-5.97	107.57	120.10
20	H	140	PRO	N-CA-CB	5.96	110.46	103.30
39	a	754	U	N1-C1'-C2'	5.93	121.71	114.00
10	B	29	G	P-O3'-C3'	5.92	126.81	119.70
20	H	330	VAL	N-CA-C	5.89	126.90	111.00
20	H	336	ASP	CB-CA-C	-5.89	98.63	110.40
11	AA	943	LYS	CA-C-N	5.87	130.12	117.20
11	AA	727	VAL	N-CA-C	-5.86	95.18	111.00
20	H	132	PRO	N-CA-CB	5.80	110.26	103.30
20	H	168	VAL	C-N-CA	5.79	136.18	121.70
14	AE	903	LEU	C-N-CA	5.79	136.17	121.70
16	D	517	G	C5'-C4'-C3'	5.68	125.08	116.00
20	H	344	LEU	CA-CB-CG	5.65	128.30	115.30
39	a	2244	U	C1'-C2'-O2'	-5.63	93.71	110.60
52	n	127	ASN	CB-CA-C	5.62	121.64	110.40
14	AE	363	LEU	CA-CB-CG	5.56	128.09	115.30
24	L	54	LEU	CA-CB-CG	5.56	128.09	115.30
11	AA	1233	LEU	CA-CB-CG	5.47	127.88	115.30
39	a	783	A	C4'-C3'-O3'	5.45	123.90	113.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	3	22	ARG	NE-CZ-NH1	5.43	123.01	120.30
63	y	109	ARG	NE-CZ-NH2	5.35	122.97	120.30
16	D	1397	C	P-O3'-C3'	5.34	126.11	119.70
16	D	1340	A	C5'-C4'-C3'	5.34	124.54	116.00
11	AA	728	ASP	N-CA-C	5.26	125.19	111.00
39	a	404	A	C2'-C3'-O3'	5.21	122.04	113.70
16	D	1340	A	C5'-C4'-O4'	5.20	115.34	109.10
39	a	742	A	C8-N9-C1'	-5.20	118.34	127.70
41	c	28	ARG	NE-CZ-NH2	-5.19	117.70	120.30
39	a	2244	U	C4'-C3'-O3'	5.19	123.37	113.00
11	AA	817	LEU	CB-CG-CD2	-5.19	102.18	111.00
20	H	169	SER	N-CA-CB	-5.18	102.73	110.50
8	7	-8	U	C2'-C3'-O3'	5.17	121.97	113.70
4	3	22	ARG	NE-CZ-NH2	-5.12	117.74	120.30
39	a	742	A	C4-N9-C1'	5.08	135.45	126.30
10	A	48	C	N1-C1'-C2'	5.07	120.59	114.00
39	a	2252	G	C4'-C3'-O3'	5.06	123.12	113.00
14	AE	807	LEU	CB-CG-CD2	-5.04	102.43	111.00
10	B	48	C	N1-C1'-C2'	5.04	120.56	114.00
14	AE	73	GLY	N-CA-C	5.04	125.70	113.10
39	a	1141	U	N1-C1'-C2'	5.04	120.55	114.00
16	D	197	A	C2'-C3'-O3'	5.01	121.72	113.70
20	H	153	GLU	N-CA-C	-5.01	97.48	111.00
39	a	2243	U	C4'-C3'-O3'	5.00	123.00	113.00

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
14	AE	1184	ASP	Peptide

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Mol	Chain	Res	Type	Group
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%)	13	44
2	1	108/110 (98%)	104 (96%)	4 (4%)	0	100	100
3	2	92/100 (92%)	90 (98%)	2 (2%)	0	100	100
4	3	101/104 (97%)	96 (95%)	4 (4%)	1 (1%)	13	44
5	4	92/94 (98%)	90 (98%)	2 (2%)	0	100	100
9	9	146/165 (88%)	95 (65%)	37 (25%)	14 (10%)	0	7
11	AA	1318/1342 (98%)	1149 (87%)	137 (10%)	32 (2%)	5	30
12	AB	94/181 (52%)	88 (94%)	6 (6%)	0	100	100
13	AC	228/329 (69%)	215 (94%)	11 (5%)	2 (1%)	14	47
13	AD	226/329 (69%)	212 (94%)	13 (6%)	1 (0%)	30	62
14	AE	1329/1358 (98%)	1200 (90%)	120 (9%)	9 (1%)	19	51

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
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	19
21	I	206/233 (88%)	196 (95%)	9 (4%)	1 (0%)	25	57
22	J	203/206 (98%)	198 (98%)	5 (2%)	0	100	100
23	K	154/167 (92%)	146 (95%)	7 (4%)	1 (1%)	22	54
24	L	102/135 (76%)	97 (95%)	4 (4%)	1 (1%)	13	44
25	M	149/179 (83%)	144 (97%)	4 (3%)	1 (1%)	19	51
26	N	127/130 (98%)	121 (95%)	5 (4%)	1 (1%)	16	49
27	O	125/130 (96%)	115 (92%)	9 (7%)	1 (1%)	16	49
28	P	97/103 (94%)	88 (91%)	8 (8%)	1 (1%)	13	44
29	Q	115/129 (89%)	104 (90%)	9 (8%)	2 (2%)	7	36
30	R	117/124 (94%)	116 (99%)	1 (1%)	0	100	100
31	S	98/101 (97%)	96 (98%)	2 (2%)	0	100	100
32	T	86/89 (97%)	82 (95%)	4 (5%)	0	100	100
33	U	80/82 (98%)	76 (95%)	3 (4%)	1 (1%)	10	40
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%)	7	35
37	Y	139/142 (98%)	102 (73%)	25 (18%)	12 (9%)	0	9
38	Z	28/121 (23%)	19 (68%)	7 (25%)	2 (7%)	1	13
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%)	30	62
47	i	54/57 (95%)	51 (94%)	3 (6%)	0	100	100
48	j	207/209 (99%)	198 (96%)	9 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
49	k	50/55 (91%)	50 (100%)	0	0	100	100
50	l	199/201 (99%)	190 (96%)	8 (4%)	1 (0%)	25	57
51	m	44/46 (96%)	43 (98%)	1 (2%)	0	100	100
52	n	175/179 (98%)	162 (93%)	11 (6%)	2 (1%)	12	43
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%)	14	47
All	All	9368/10437 (90%)	8605 (92%)	660 (7%)	103 (1%)	15	43

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
36	X	103	LYS

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Mol	Chain	Res	Type
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
14	AE	51	PRO
14	AE	805	GLN
20	H	76	GLU
20	H	142	ARG
28	P	58	ASN
29	Q	119	ASN
36	X	105	ASN
37	Y	20	SER
37	Y	64	ARG
37	Y	106	GLN
9	9	69	PHE
9	9	73	LYS

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Mol	Chain	Res	Type
9	9	108	VAL
9	9	129	LEU
9	9	133	GLU
11	AA	850	ILE
11	AA	943	LYS
11	AA	995	ASP
13	AC	165	GLU
14	AE	174	ASP
14	AE	193	ASP
21	I	80	LYS
25	M	130	ASN
37	Y	83	ALA
38	Z	21	GLU
52	n	40	VAL
11	AA	917	SER
11	AA	991	LYS
11	AA	997	TRP
11	AA	1044	PRO
14	AE	91	GLU
20	H	70	VAL
20	H	82	THR
37	Y	22	PRO
37	Y	71	LYS
37	Y	89	SER
38	Z	7	ILE
4	3	39	ILE
9	9	28	ALA
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
33	U	64	GLY

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Mol	Chain	Res	Type
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%)	12	39
2	1	93/93 (100%)	84 (90%)	9 (10%)	6	28
3	2	81/84 (96%)	76 (94%)	5 (6%)	15	42
4	3	84/85 (99%)	78 (93%)	6 (7%)	12	39
5	4	78/78 (100%)	74 (95%)	4 (5%)	20	47
9	9	112/123 (91%)	65 (58%)	47 (42%)	0	0
11	AA	1140/1157 (98%)	1039 (91%)	101 (9%)	8	31
12	AB	86/158 (54%)	84 (98%)	2 (2%)	45	64
13	AC	198/286 (69%)	182 (92%)	16 (8%)	9	34
13	AD	196/286 (68%)	194 (99%)	2 (1%)	73	82
14	AE	1120/1134 (99%)	1051 (94%)	69 (6%)	15	42
15	C	57/65 (88%)	55 (96%)	2 (4%)	31	56
17	E	65/66 (98%)	60 (92%)	5 (8%)	10	37
18	F	60/61 (98%)	57 (95%)	3 (5%)	20	47
19	G	187/199 (94%)	178 (95%)	9 (5%)	21	48
20	H	137/461 (30%)	128 (93%)	9 (7%)	14	41
21	I	171/190 (90%)	165 (96%)	6 (4%)	31	56
22	J	172/173 (99%)	165 (96%)	7 (4%)	26	52
23	K	119/126 (94%)	112 (94%)	7 (6%)	16	44
24	L	91/116 (78%)	85 (93%)	6 (7%)	14	41

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
25	M	124/147 (84%)	116 (94%)	8 (6%)	14	41
26	N	104/105 (99%)	102 (98%)	2 (2%)	52	70
27	O	105/107 (98%)	100 (95%)	5 (5%)	21	48
28	P	86/90 (96%)	78 (91%)	8 (9%)	7	30
29	Q	90/99 (91%)	87 (97%)	3 (3%)	33	57
30	R	101/104 (97%)	94 (93%)	7 (7%)	13	39
31	S	83/84 (99%)	79 (95%)	4 (5%)	21	48
32	T	76/77 (99%)	64 (84%)	12 (16%)	2	14
33	U	65/65 (100%)	60 (92%)	5 (8%)	10	37
34	V	74/78 (95%)	72 (97%)	2 (3%)	40	61
35	W	72/79 (91%)	68 (94%)	4 (6%)	17	45
36	X	94/96 (98%)	85 (90%)	9 (10%)	7	28
37	Y	109/110 (99%)	73 (67%)	36 (33%)	0	1
38	Z	26/85 (31%)	12 (46%)	14 (54%)	0	0
40	b	58/63 (92%)	57 (98%)	1 (2%)	56	73
41	c	67/68 (98%)	64 (96%)	3 (4%)	23	50
43	e	54/55 (98%)	53 (98%)	1 (2%)	52	70
44	f	48/49 (98%)	46 (96%)	2 (4%)	25	51
45	g	59/62 (95%)	53 (90%)	6 (10%)	6	26
46	h	216/218 (99%)	199 (92%)	17 (8%)	10	36
47	i	47/48 (98%)	41 (87%)	6 (13%)	3	19
48	j	164/164 (100%)	157 (96%)	7 (4%)	25	50
49	k	47/49 (96%)	44 (94%)	3 (6%)	14	42
50	l	165/165 (100%)	151 (92%)	14 (8%)	8	33
51	m	38/38 (100%)	35 (92%)	3 (8%)	10	36
52	n	148/150 (99%)	134 (90%)	14 (10%)	7	29
53	o	51/52 (98%)	46 (90%)	5 (10%)	6	27
54	p	136/138 (99%)	132 (97%)	4 (3%)	37	59
55	q	34/34 (100%)	32 (94%)	2 (6%)	16	44
56	r	114/114 (100%)	104 (91%)	10 (9%)	8	32
57	s	116/116 (100%)	110 (95%)	6 (5%)	19	46

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
58	t	104/104 (100%)	98 (94%)	6 (6%)	17	44
59	u	103/103 (100%)	97 (94%)	6 (6%)	17	44
60	v	109/109 (100%)	103 (94%)	6 (6%)	18	45
61	w	99/103 (96%)	91 (92%)	8 (8%)	9	34
62	x	86/87 (99%)	80 (93%)	6 (7%)	12	39
63	y	99/100 (99%)	95 (96%)	4 (4%)	27	52
64	z	89/90 (99%)	87 (98%)	2 (2%)	47	65
All	All	7791/8630 (90%)	7209 (92%)	582 (8%)	14	37

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	7	HIS
2	1	19	LEU
2	1	30	SER
2	1	41	LYS
2	1	69	LEU
2	1	97	LEU
2	1	107	VAL
2	1	109	ASP
2	1	110	ARG
3	2	1	MET
3	2	24	MET
3	2	37	ASP
3	2	59	ASN
3	2	93	LEU
4	3	52	LEU
4	3	68	SER
4	3	72	ILE
4	3	89	ASP
4	3	99	ASN
4	3	101	GLU
5	4	40	ILE
5	4	41	GLU

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Mol	Chain	Res	Type
5	4	69	GLU
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

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Mol	Chain	Res	Type
9	9	123	ILE
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

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Mol	Chain	Res	Type
11	AA	949	GLU
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

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Mol	Chain	Res	Type
11	AA	1022	LYS
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

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Mol	Chain	Res	Type
13	AD	12	ARG
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

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Mol	Chain	Res	Type
14	AE	180	MET
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

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Mol	Chain	Res	Type
19	G	105	LYS
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

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Mol	Chain	Res	Type
25	M	17	LYS
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

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Mol	Chain	Res	Type
32	T	66	LEU
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	71	LYS

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Mol	Chain	Res	Type
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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Mol	Chain	Res	Type
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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Mol	Chain	Res	Type
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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Mol	Chain	Res	Type
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 (5) such sidechains are listed below:

Mol	Chain	Res	Type
9	9	103	ASN
19	G	18	HIS
23	K	70	ASN
36	X	105	ASN
59	u	4	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
10	A	75/76 (98%)	29 (38%)	6 (8%)
10	B	75/76 (98%)	35 (46%)	6 (8%)
16	D	1515/1542 (98%)	288 (19%)	35 (2%)
39	a	2859/2904 (98%)	532 (18%)	0
42	d	119/120 (99%)	17 (14%)	0
8	7	24/37 (64%)	15 (62%)	3 (12%)
All	All	4667/4755 (98%)	916 (19%)	50 (1%)

All (916) RNA backbone outliers are listed below:

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

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

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Mol	Chain	Res	Type
10	B	14	A
10	B	15	G
10	B	16	C
10	B	17	C
10	B	18	G
10	B	19	G
10	B	20	U
10	B	21	A
10	B	22	G
10	B	23	C
10	B	30	G
10	B	31	G
10	B	32	C
10	B	36	U
10	B	37	A
10	B	38	A
10	B	46	G
10	B	47	U
10	B	48	C
10	B	49	G
10	B	52	G
10	B	57	A
10	B	58	A
10	B	59	A
10	B	61	C
10	B	66	C
10	B	69	C
10	B	71	C
10	B	73	A
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

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Mol	Chain	Res	Type
16	D	54	C
16	D	69	G
16	D	70	U
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

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Mol	Chain	Res	Type
16	D	258	G
16	D	262	A
16	D	266	G
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

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Mol	Chain	Res	Type
16	D	467	U
16	D	468	A
16	D	469	C
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

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Mol	Chain	Res	Type
16	D	734	G
16	D	747	A
16	D	748	G
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

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Mol	Chain	Res	Type
16	D	1021	A
16	D	1024	G
16	D	1026	G
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

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Mol	Chain	Res	Type
16	D	1211	U
16	D	1212	U
16	D	1213	A
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

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Mol	Chain	Res	Type
16	D	1398	A
16	D	1404	C
16	D	1419	G
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

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Mol	Chain	Res	Type
39	a	114	U
39	a	118	A
39	a	119	A
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

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Mol	Chain	Res	Type
39	a	372	G
39	a	373	U
39	a	375	G
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

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Mol	Chain	Res	Type
39	a	616	A
39	a	618	G
39	a	621	A
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

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Mol	Chain	Res	Type
39	a	892	A
39	a	893	C
39	a	895	U
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

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Mol	Chain	Res	Type
39	a	1070	A
39	a	1071	G
39	a	1073	A
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

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Mol	Chain	Res	Type
39	a	1271	G
39	a	1272	A
39	a	1273	U
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	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

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Mol	Chain	Res	Type
39	a	1537	G
39	a	1554	U
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

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Mol	Chain	Res	Type
39	a	1833	C
39	a	1847	A
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

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Mol	Chain	Res	Type
39	a	2027	G
39	a	2033	A
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

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Mol	Chain	Res	Type
39	a	2162	G
39	a	2163	A
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

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Mol	Chain	Res	Type
39	a	2333	A
39	a	2339	C
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

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Mol	Chain	Res	Type
39	a	2554	U
39	a	2566	A
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

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Mol	Chain	Res	Type
39	a	2850	A
39	a	2859	G
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:

Mol	Chain	Res	Type
8	7	-8	U
8	7	-5	U
8	7	-3	U
10	A	6	G
10	A	7	G
10	A	9	G
10	A	22	G
10	A	60	U
10	A	70	G
10	B	6	G
10	B	7	G
10	B	9	G

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Mol	Chain	Res	Type
10	B	22	G
10	B	37	A
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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 3 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

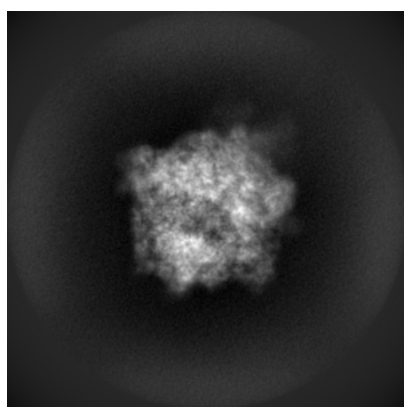
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-21470. These allow visual inspection of the internal detail of the map and identification of artifacts.

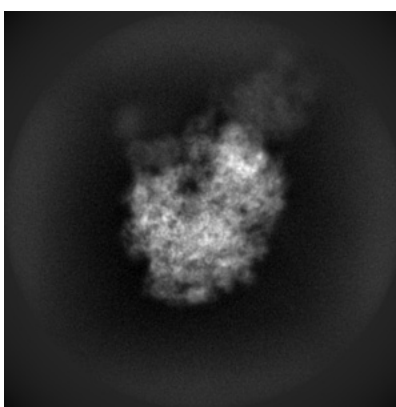
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

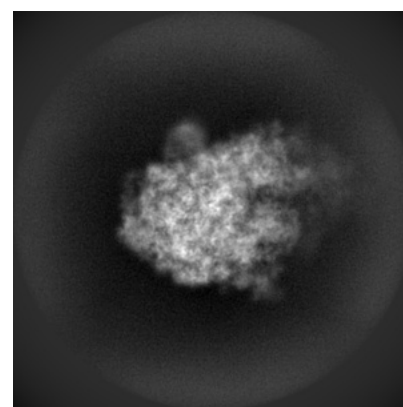
6.1.1 Primary map



X



Y

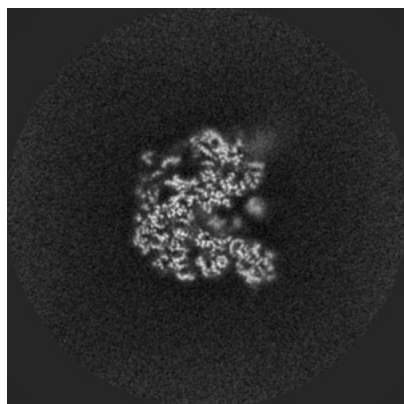


Z

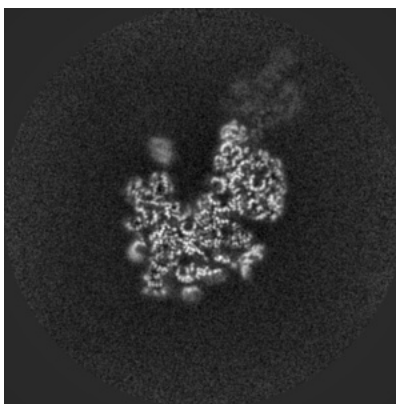
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

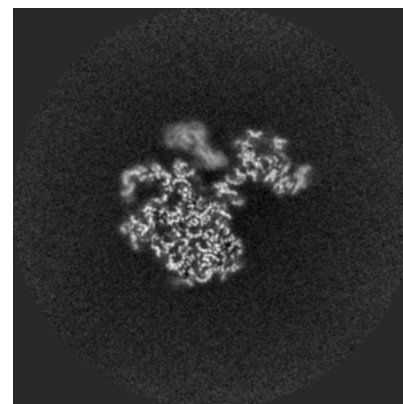
6.2.1 Primary map



X Index: 250



Y Index: 250

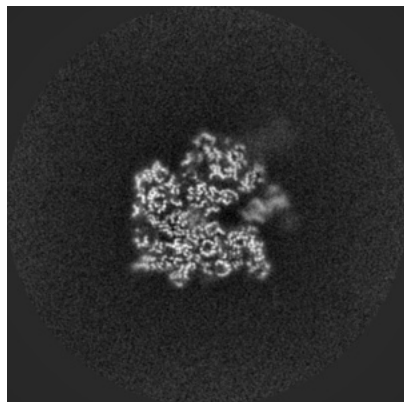


Z Index: 250

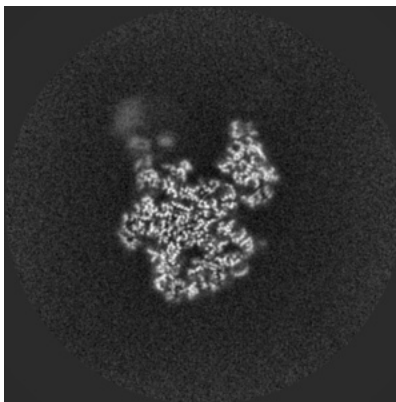
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

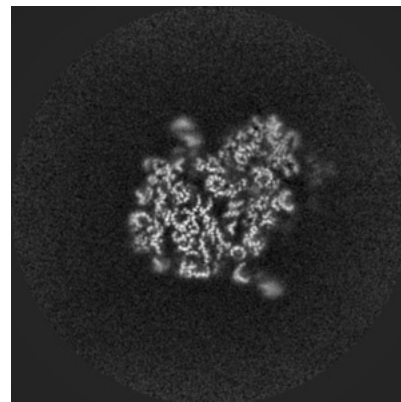
6.3.1 Primary map



X Index: 238



Y Index: 213

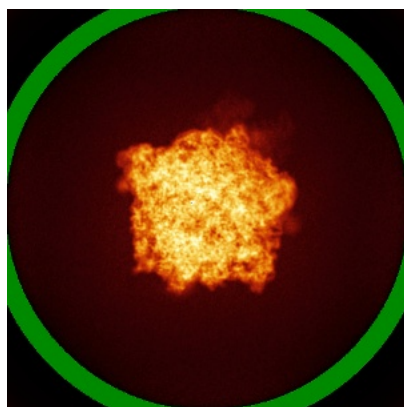


Z Index: 276

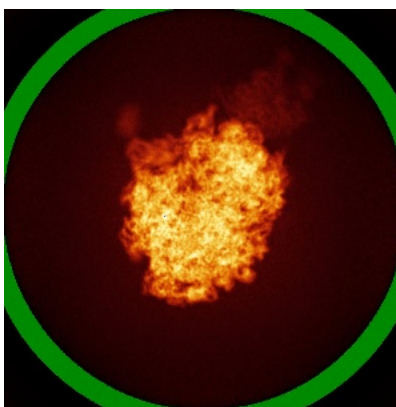
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map



X



Y



Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.00868. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

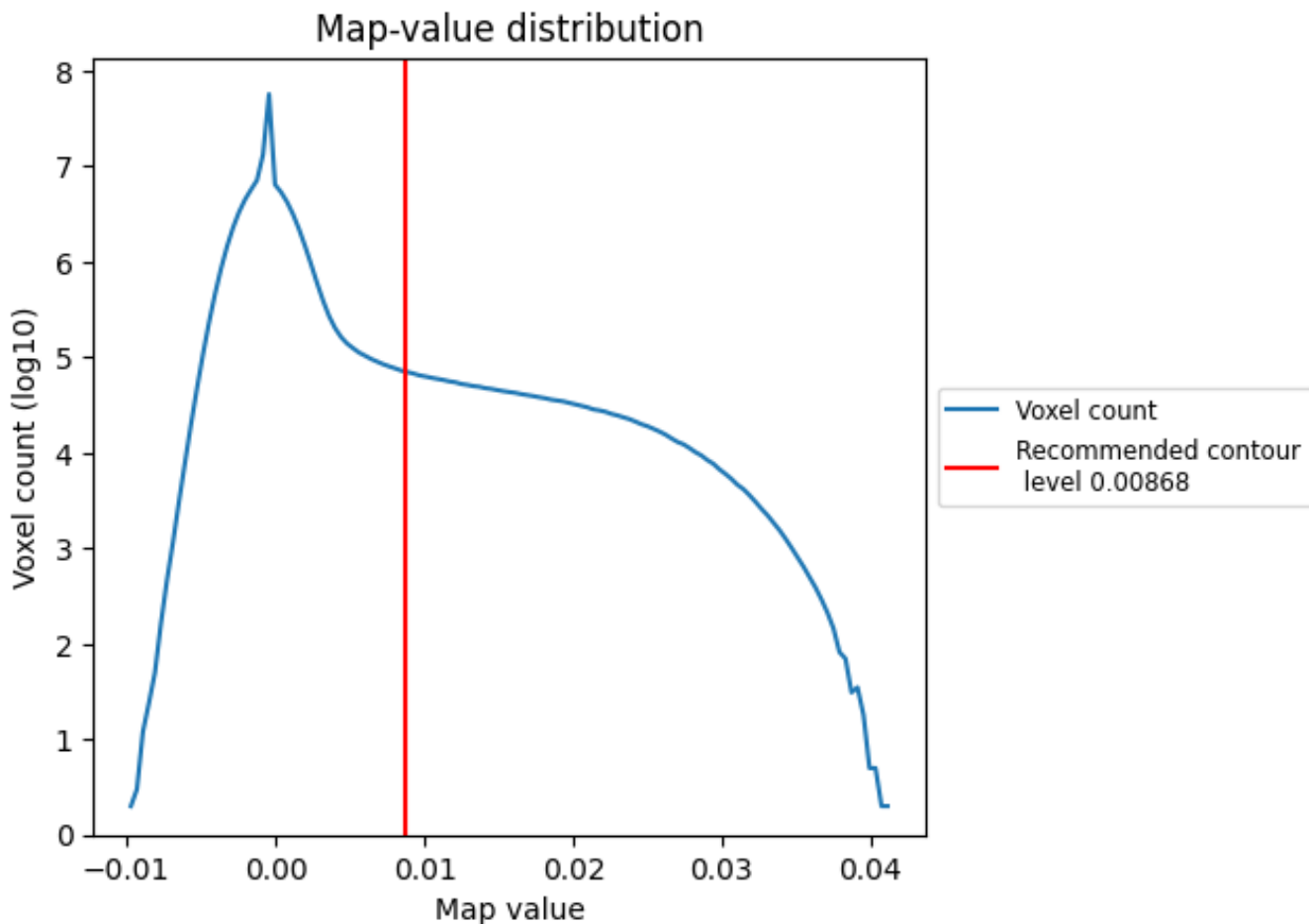
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

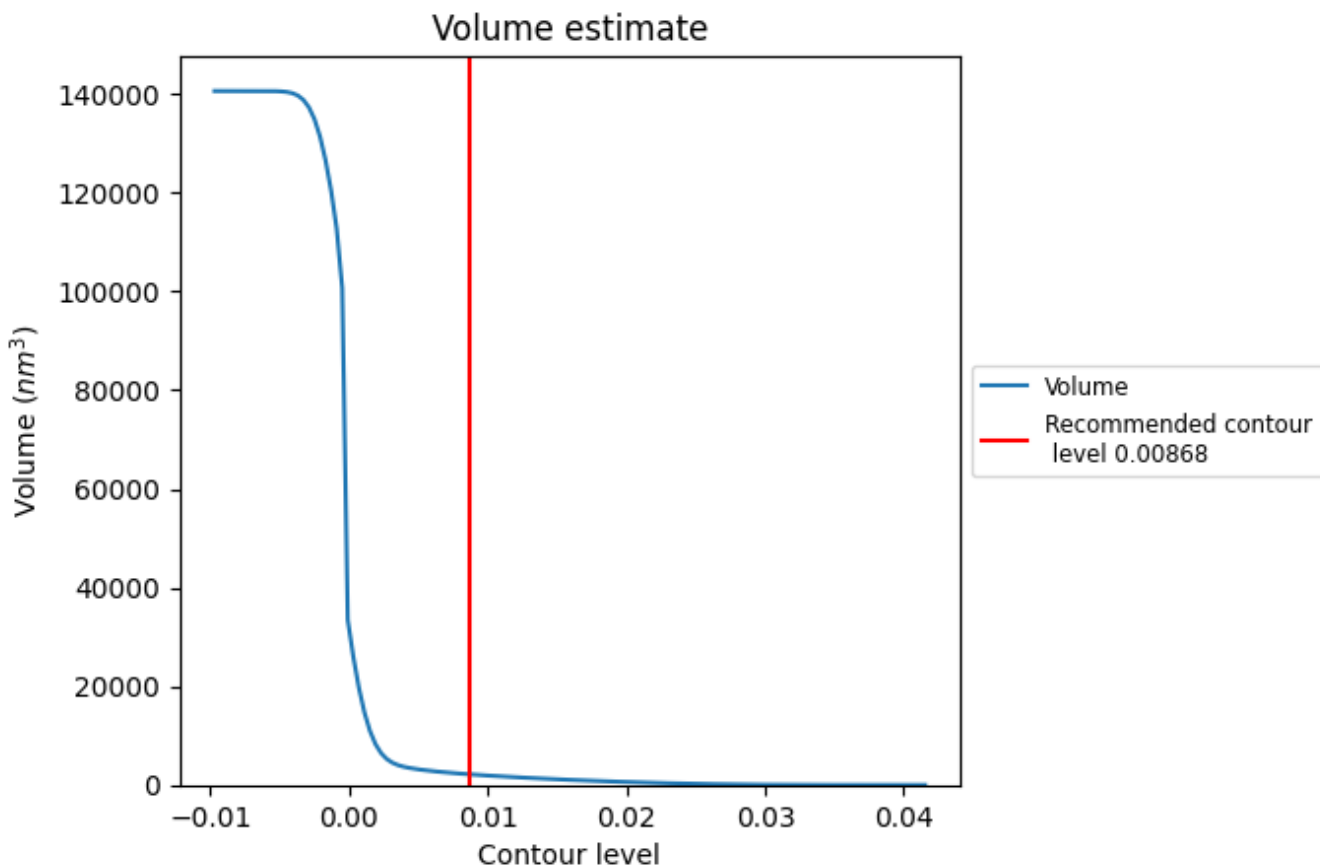
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

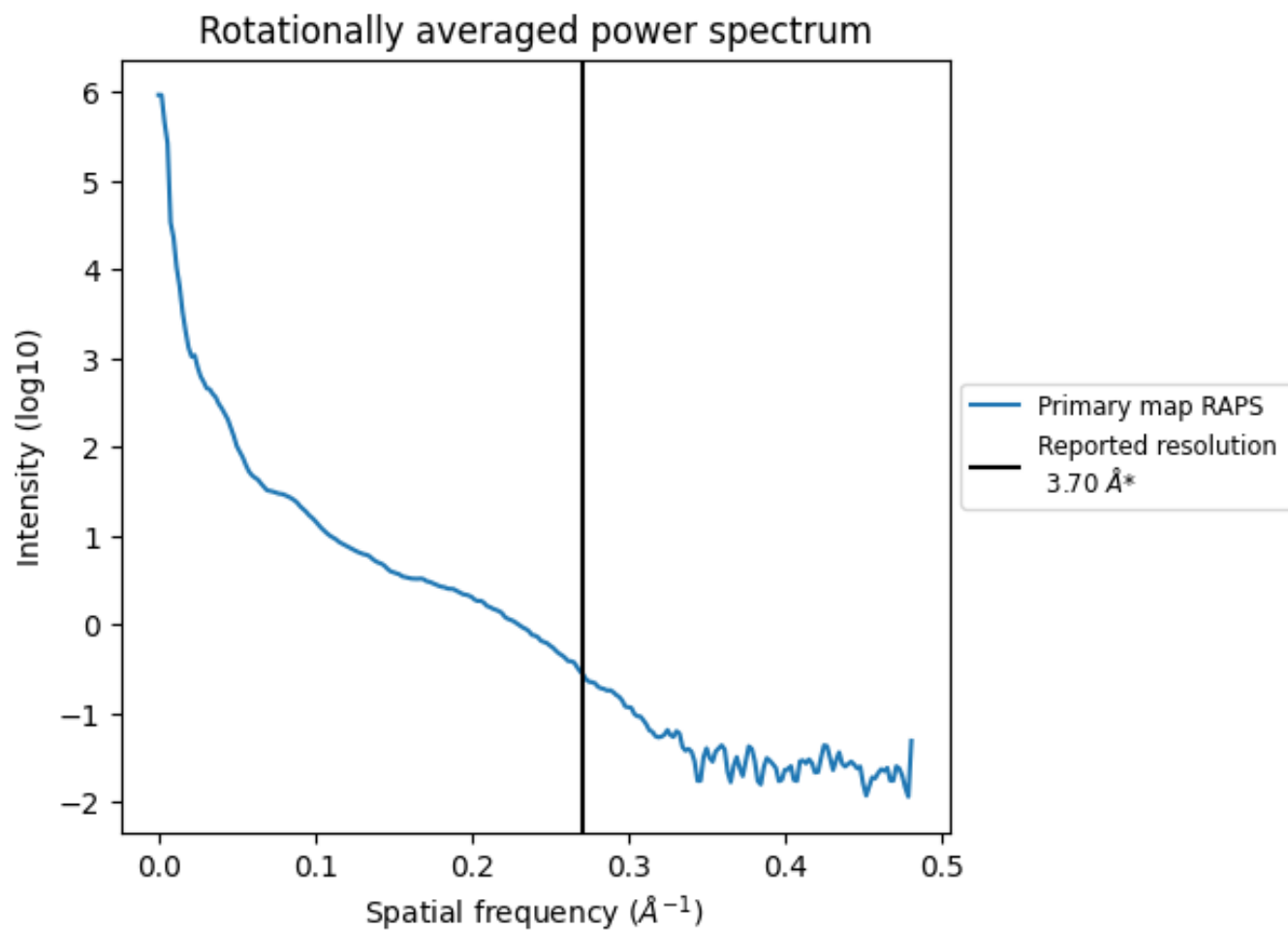
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 2155 nm^3 ; this corresponds to an approximate mass of 1947 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 0.270\AA^{-1}

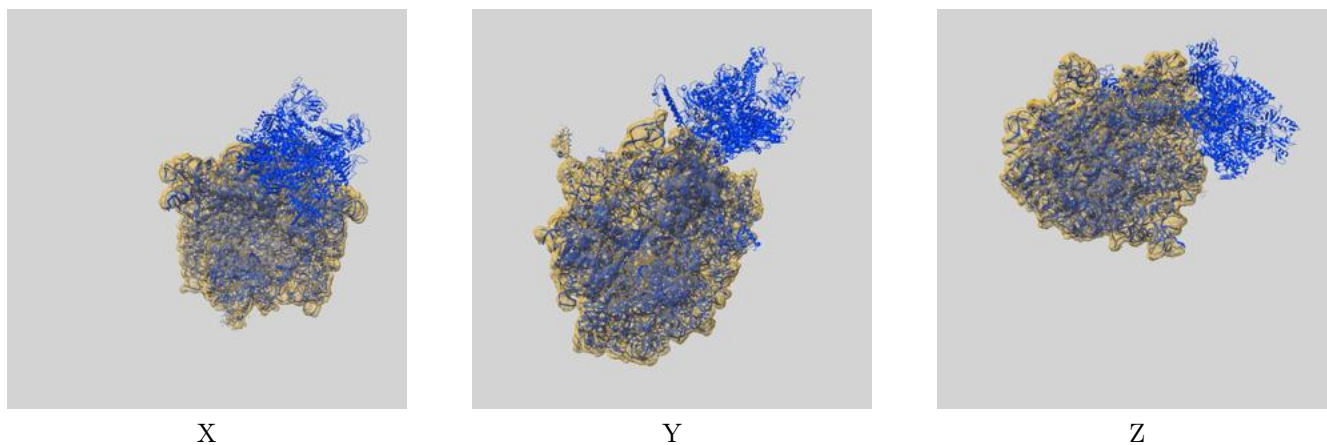
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

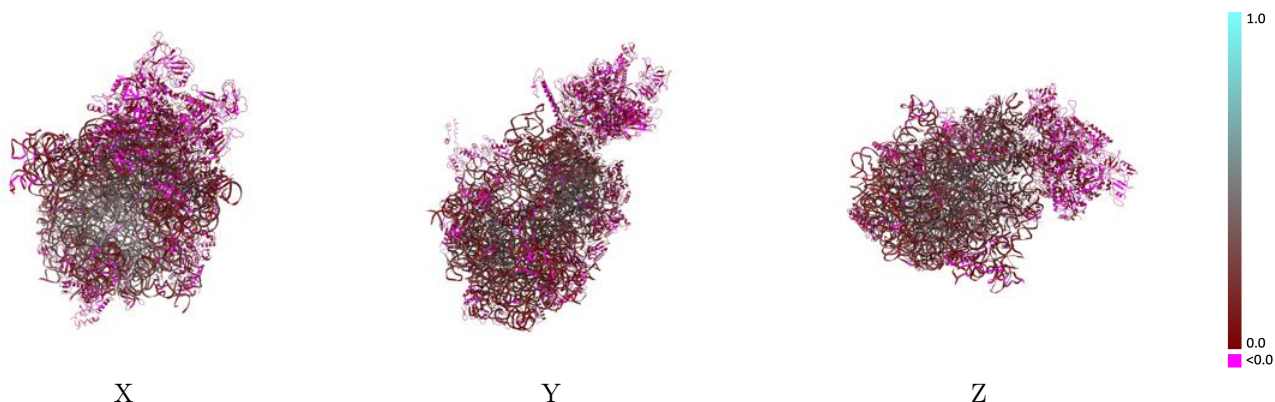
This section contains information regarding the fit between EMDB map EMD-21470 and PDB model 6VYS. Per-residue inclusion information can be found in section 3 on page 16.

9.1 Map-model overlay [i](#)



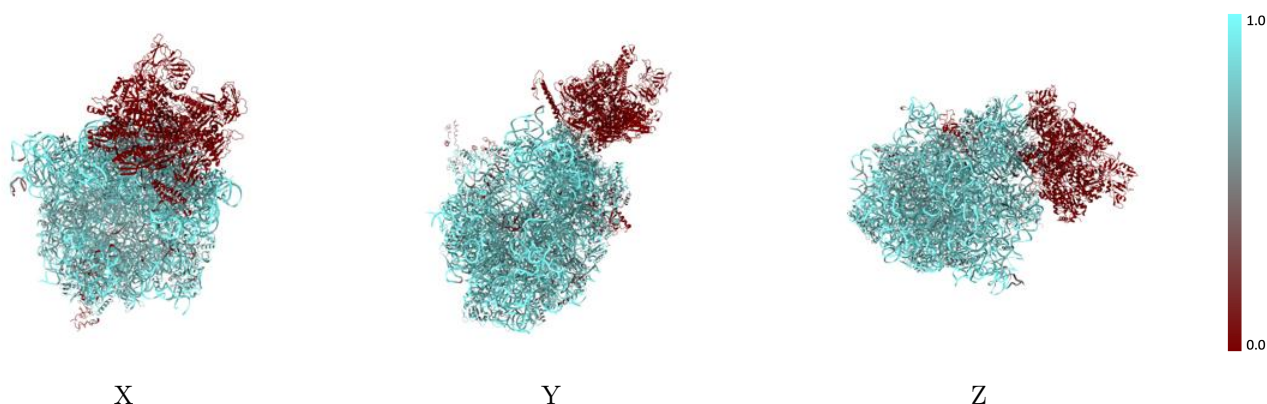
The images above show the 3D surface view of the map at the recommended contour level 0.00868 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



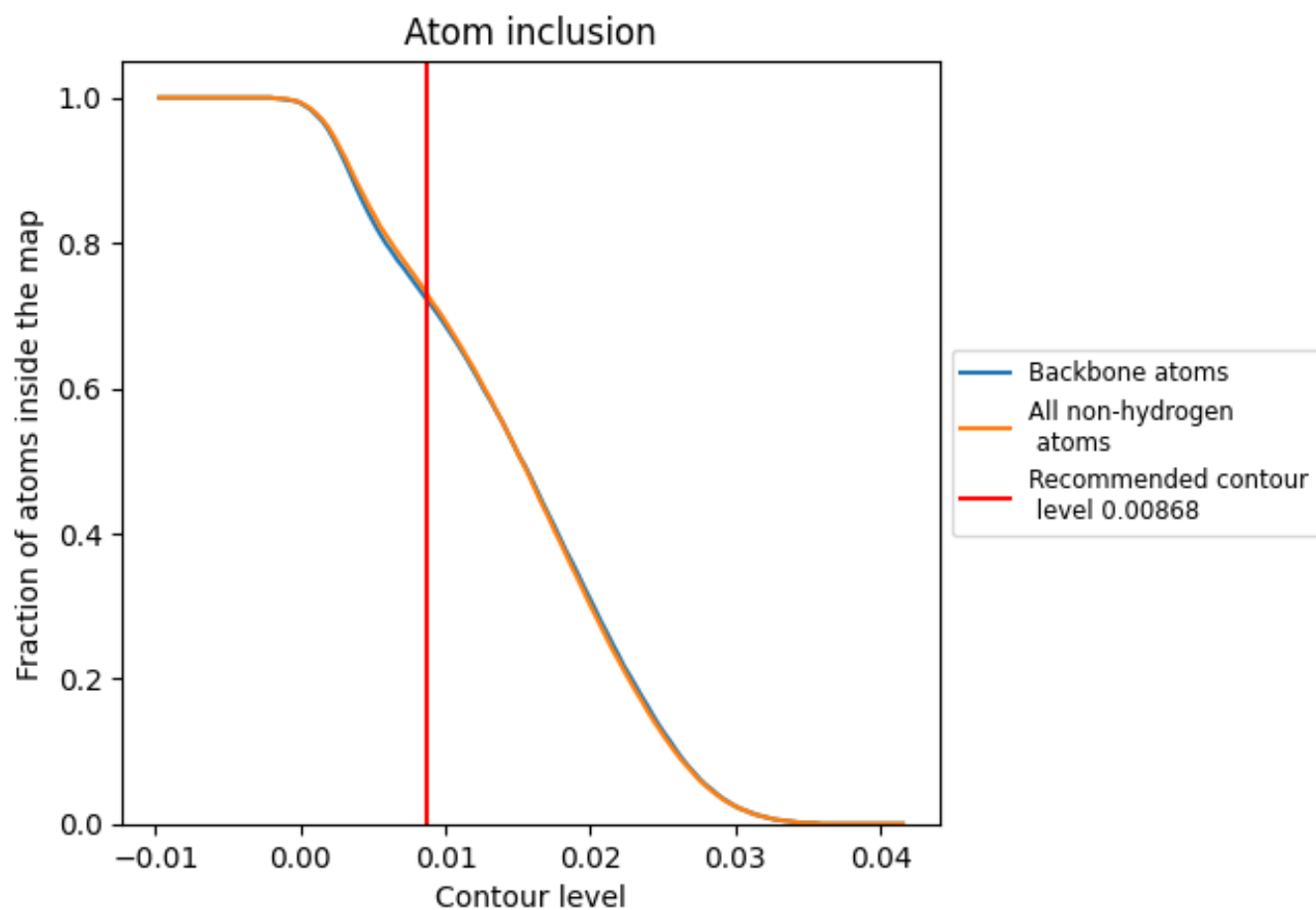
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.00868).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 72% of all backbone atoms, 73% 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 (0.00868) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7320	 0.1950
0	 0.8140	 0.1990
1	 0.7810	 0.2550
2	 0.7000	 0.1110
3	 0.7650	 0.0900
4	 0.8100	 0.1990
5	 0.0000	 0.0130
6	 0.0180	 0.1500
7	 0.3070	 0.1010
9	 0.5580	 0.0400
A	 0.8900	 0.1870
AA	 0.0080	 0.0770
AB	 0.0000	 0.0340
AC	 0.0180	 0.1010
AD	 0.0000	 0.0460
AE	 0.0010	 0.0650
B	 0.6520	 0.0930
C	 0.7840	 0.1820
D	 0.9470	 0.2610
E	 0.7200	 0.0870
F	 0.7080	 0.2360
G	 0.7490	 0.1920
H	 0.1450	 0.0410
I	 0.7550	 0.2330
J	 0.7790	 0.1880
K	 0.8300	 0.3220
L	 0.7150	 0.1180
M	 0.7510	 0.1930
N	 0.8120	 0.2400
O	 0.8210	 0.1920
P	 0.7490	 0.1880
Q	 0.7690	 0.2140
R	 0.8290	 0.3250
S	 0.7930	 0.1770
T	 0.7800	 0.1690



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Chain	Atom inclusion	Q-score
U	 0.7370	 0.1070
V	 0.7780	 0.2040
W	 0.6270	 0.0470
X	 0.6820	 0.1050
Y	 0.4350	 0.0490
Z	 0.1760	 0.0610
a	 0.9340	 0.2370
b	 0.7900	 0.1940
c	 0.7390	 0.1720
d	 0.9290	 0.1880
e	 0.7490	 0.0770
f	 0.8100	 0.2460
g	 0.6970	 0.0790
h	 0.7390	 0.1500
i	 0.8110	 0.2560
j	 0.7950	 0.2150
k	 0.7030	 0.1200
l	 0.7300	 0.1640
m	 0.8280	 0.2680
n	 0.7170	 0.1030
o	 0.7430	 0.2070
p	 0.7690	 0.1100
q	 0.7980	 0.1930
r	 0.5710	 0.0620
s	 0.8150	 0.2330
t	 0.7320	 0.2060
u	 0.7800	 0.1890
v	 0.7810	 0.2590
w	 0.7930	 0.1840
x	 0.7520	 0.0520
y	 0.7420	 0.1430
z	 0.8410	 0.2700