Full wwPDB EM Validation Report

Oct 20, 2024 – 09:35 AM EDT

PDB ID	:	6VYQ
EMDB ID	:	EMD-21468
Title	:	Escherichia coli transcription-translation complex A1 (TTC-A1) containing an 15 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:

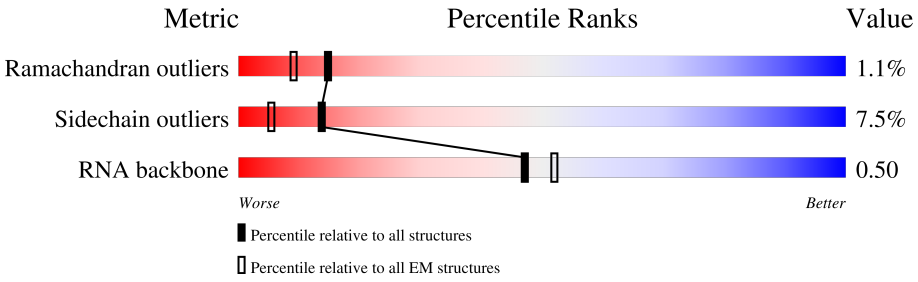
EMDB validation analysis	:	0.0.1.dev113
MolProbity	:	4.02b-467
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	: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

1 Overall quality at a glance (i)

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 <=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	7% 93% 7%
2	1	110	• 92% 8%
3	2	100	26% 89% 5% 6%
4	3	104	18% 91% 8% •
5	4	94	23% 96% •
6	5	36	64% 47% 17% 36%
7	6	36	75% 64% 11% 25%
8	7	32	97% 25% 72% •

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Mol	Chain	Length	Quality of chain
9	9	165	62% 54% 33% 10%
10	A	76	24% 58% 38%
10	B	76	49% 46% 49% 5%
11	AA	1341	99% 89% 8%
12	AB	181	54% 53% 46%
13	AC	329	70% 64% 5% 30%
13	AD	329	69% 69% 31%
14	AE	1407	95% 89% 5% 5%
15	C	75	36% 85% 12%
16	D	1542	78% 20%
17	E	87	49% 93% 6%
18	F	71	38% 94%
19	G	241	49% 90% 7%
20	H	557	46% 41% 54%
21	I	233	46% 86% 11%
22	J	206	44% 96%
23	K	167	24% 89% 5% 7%
24	L	135	44% 72% 23%
25	M	179	41% 80% 16%
26	N	130	33% 97%
27	O	130	43% 93% 5%
28	P	99	40% 91% 9%
29	Q	129	22% 87% 9%
30	R	124	11% 92% 6%
31	S	101	51% 95%

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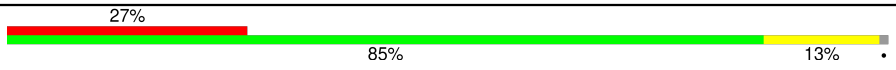
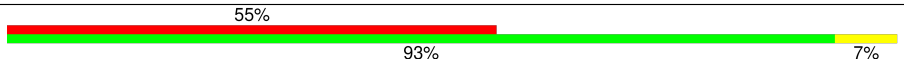
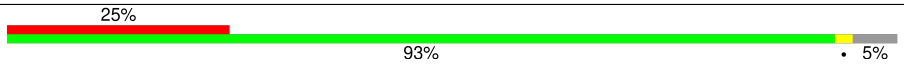
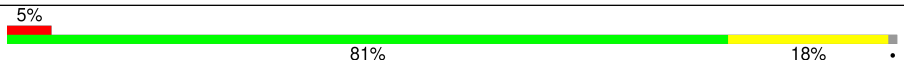
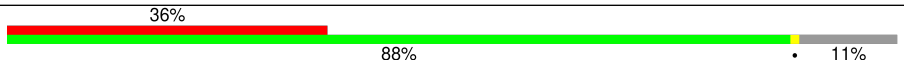
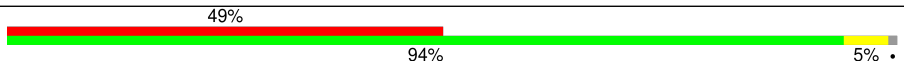
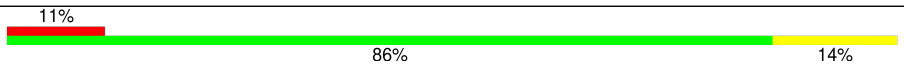
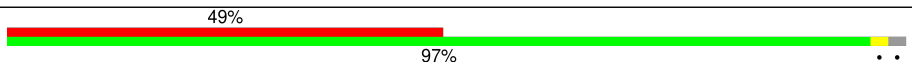
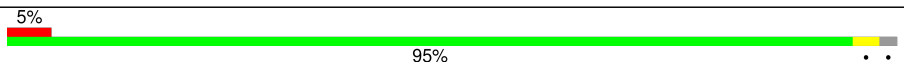
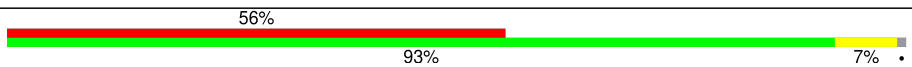
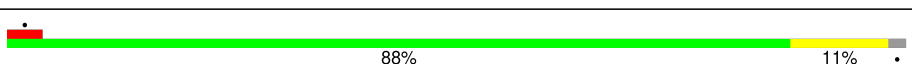
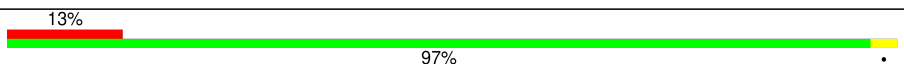
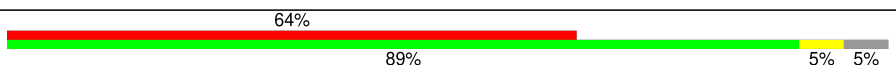
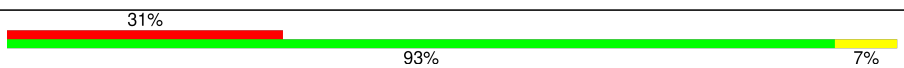
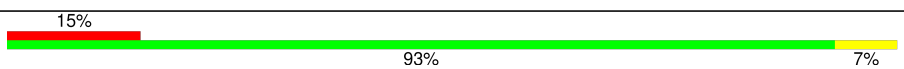
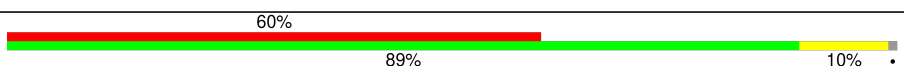
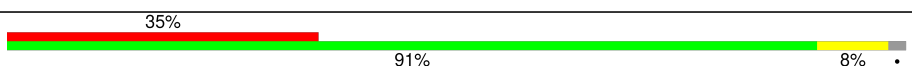
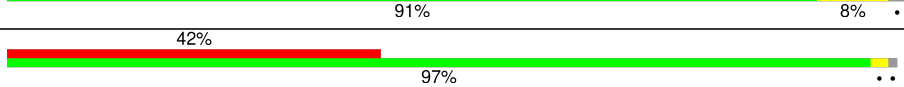
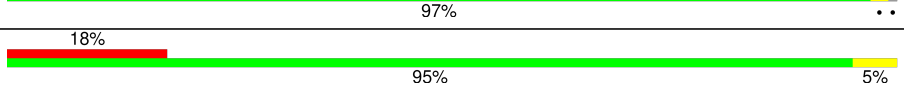
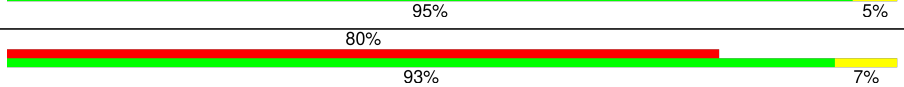
Mol	Chain	Length	Quality of chain
32	T	89	
33	U	82	
34	V	84	
35	W	92	
36	X	118	
37	Y	142	
38	Z	121	
39	a	2904	
40	b	85	
41	c	78	
42	d	120	
43	e	63	
44	f	59	
45	g	70	
46	h	273	
47	i	57	
48	j	209	
49	k	55	
50	l	201	
51	m	46	
52	n	179	
53	o	65	
54	p	177	
55	q	38	
56	r	149	

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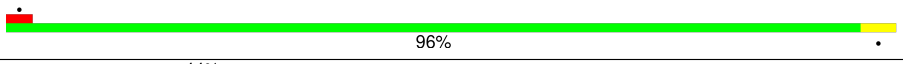
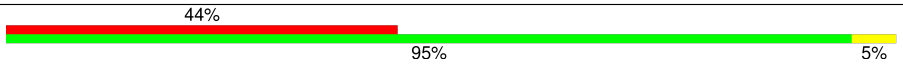
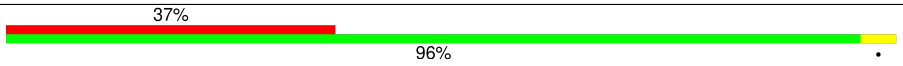
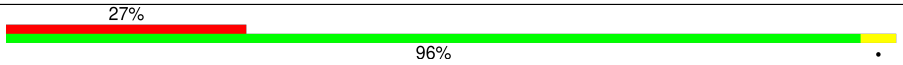
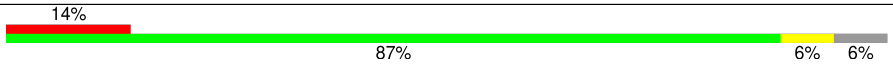
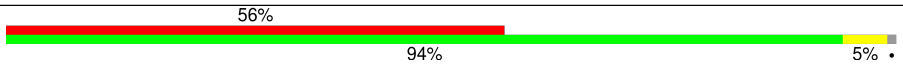
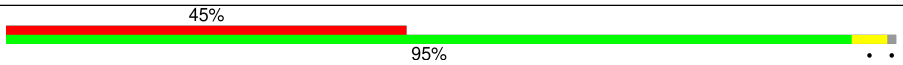
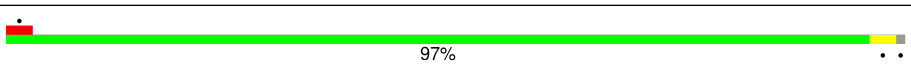
Mol	Chain	Length	Quality of chain
57	s	142	
58	t	123	
59	u	144	
60	v	136	
61	w	127	
62	x	117	
63	y	115	
64	z	118	

2 Entry composition

There are 66 unique types of molecules in this entry. The entry contains 300668 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
1	0	103	Total	C	H	N	O	S	0	0
			1655	516	839	153	145	2		

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

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

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

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

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

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

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

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

- Molecule 6 is a DNA chain called NT DNA.

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

- 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 15 nt long spacer.

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

- 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
13	AD	228	Total	C	H	N	O	S	0	0
			3556	1100	1789	312	349	6		

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

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

There is a discrepancy between the modelled and reference sequences:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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
40	b	76	Total	C	H	N	O	S	0	0
			1181	360	599	117	104	1		

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

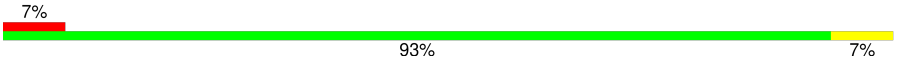
Mol	Chain	Residues	Atoms		AltConf
66	AE	2	Total	Zn	0
			2	2	

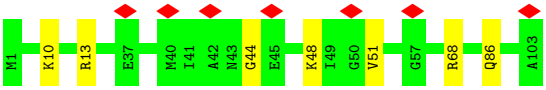
3 Residue-property plots (i)

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

• Molecule 1: 50S ribosomal protein L21

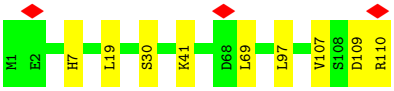
Chain 0:





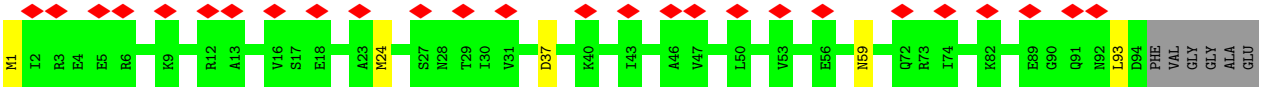
• Molecule 2: 50S ribosomal protein L22

Chain 1:



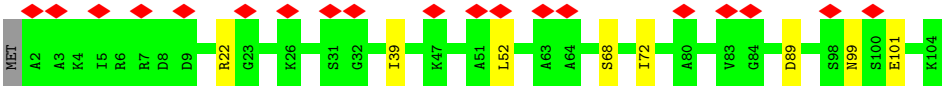
• Molecule 3: 50S ribosomal protein L23

Chain 2:



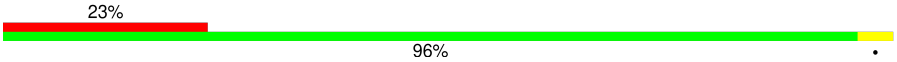
• Molecule 4: 50S ribosomal protein L24

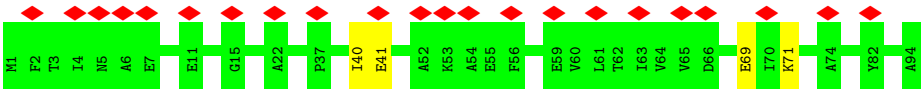
Chain 3:



• Molecule 5: 50S ribosomal protein L25

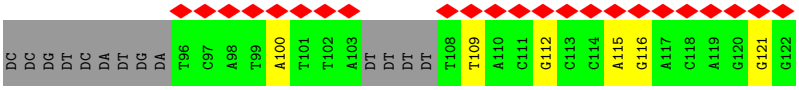
Chain 4:





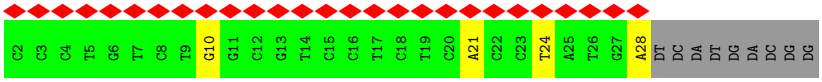
• Molecule 6: NT DNA

Chain 5:



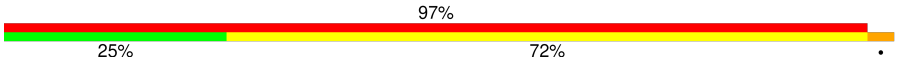
• Molecule 7: T DNA

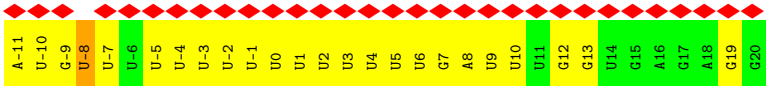
Chain 6:



• Molecule 8: mRNA with 15 nt long spacer

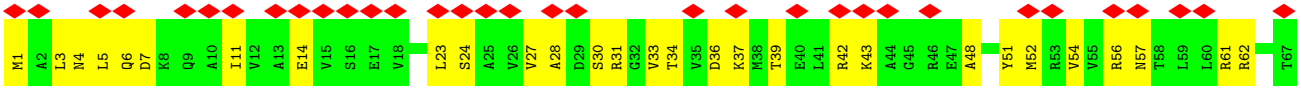
Chain 7:

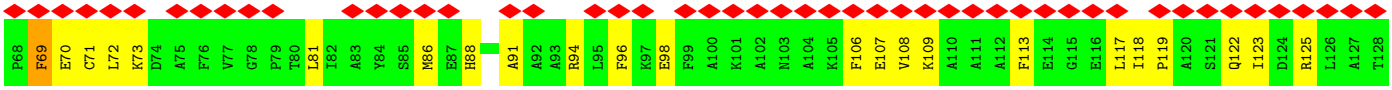


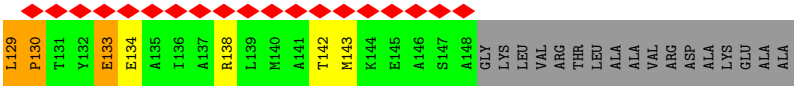


• Molecule 9: 50S ribosomal protein L10

Chain 9:

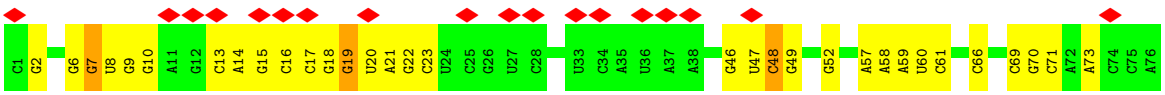






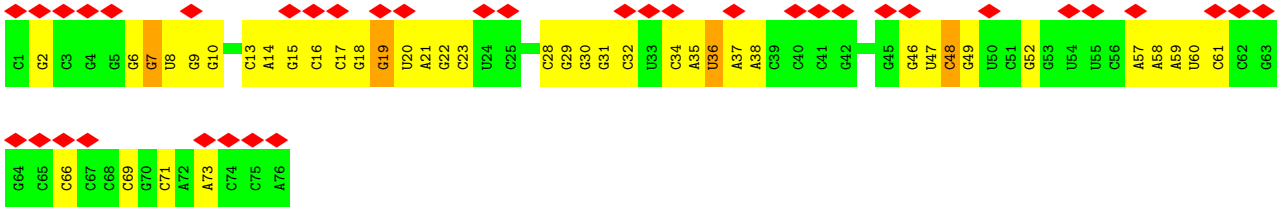
• Molecule 10: E-site and P-site tRNA (fMet)

Chain A:



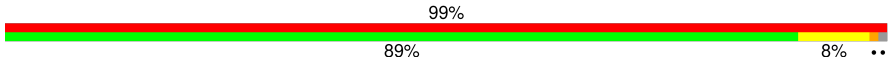
• Molecule 10: E-site and P-site tRNA (fMet)

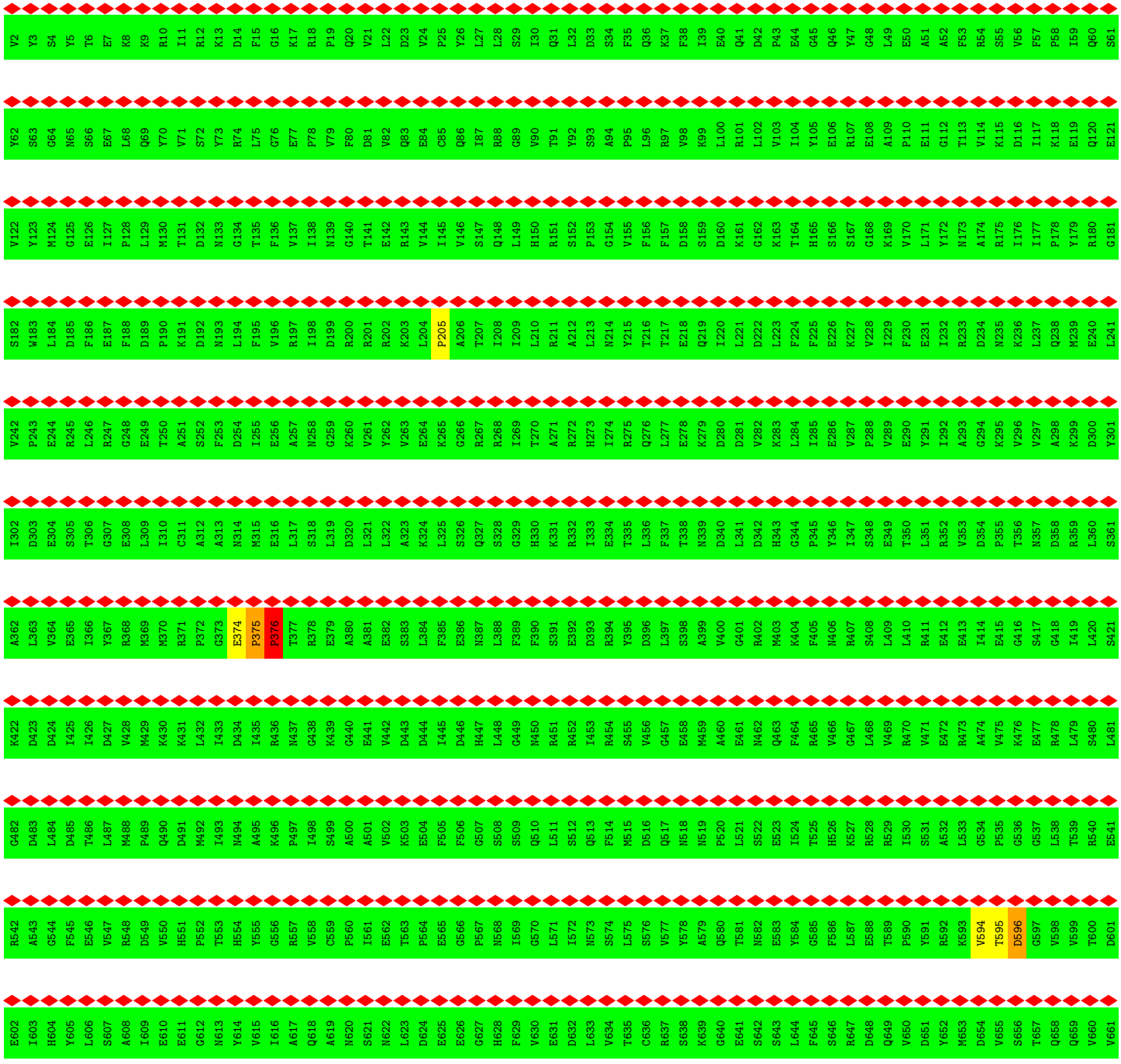
Chain B:



• Molecule 11: DNA-directed RNA polymerase subunit beta

Chain AA:





S662 V663 G664 A665 S666 L667 I668 P669 F670 L671 E672 H673 D674 D675 A676 N677 R678 A679 L680 M681 G682 A683 N684 M685 Q686 R687 Q688 A689 V690 P691 T692 L693 R694 A695 D696 K697 P698 L699 V700 G701 T702 G703 M704 E705 R706 A707 V708 A709 V710 D711 S712 G713 V714 T715 A716 V717 A718 K719 R720 G721

G722 V723 V724 Q725 Y726 V727 D728 A729 S730 R731 I732 V733 I734 K735 V736 N737 E738 D739 E740 M741 Y742 P743 G744 E745 A746 G747 I748 D749 I750 Y751 N752 L753 T754 K755 Y756 T757 R758 S759 N760 Q761 N762 T763 C764 I765 N766 Q767 M768 P769 C770 V771 S772 L773 G774 E775 P776 V777 E778 R779 G780 D781

V782 L783 A784 D785 G786 P787 S788 T789 D790 L791 G792 E793 L794 A795 L796 G797 Q798 N799 M800 R801 V802 A803 F804 M805 P806 W807 N808 G809 Y810 N811 F812 E813 D814 S815 I816 L817 V818 S819 E820 R821 V822 V823 Q824 E825 D826 R827 F828 T829 T830 I831 H832 I833 Q834 E835 L836 A837 C838 V839 S840 R841

D842 T843 K844 L845 G846 P847 E848 E849 I850 T851 A852 D853 I854 P855 N856 V857 G858 E859 A860 A861 L862 S863 K864 L865 D866 E867 S868 G869 I870 V871 Y872 I873 G874 A875 E876 V877 T878 G879 G880 D881 I882 L883 V884 G885 K886 V887 T888 P889 K890 G891 GLU THR GLN LEU THR PRO GLU GLU LYS LEU

LEU ARG ALA ILE PHE GLY GLU LYS ALA S911 D912 V913 K914 D915 S916 S917 L918 R919 V920 P921 N922 G923 V924 S925 G926 T927 V928 I929 D930 V931 Q932 V933 F934 T935 R936 D937 G938 V939 E940 K941 D942 K943 R944 A945 L946 E947 I948 E949 E950 M951 Q952 L953 K954 Q955 A956 K957 K958 D959 L960 S961

E962 E963 L964 Q965 I966 L967 E968 A969 G970 L971 F972 S973 R974 I975 R976 A977 V978 L979 V980 A981 G982 G983 V984 E985 A986 E987 K988 L989 D990 K991 L992 P993 R994 D995 R996 W997 L998 E999 L1000 G1001 L1002 T1003 D1004 E1005 E1006 K1007 Q1008 N1009 Q1010 L1011 E1012 Q1013 L1014 A1015 E1016 Q1017 Y1018 D1019 E1020 L1021

K1022 H1023 E1024 F1025 E1026 K1027 K1028 L1029 E1030 A1031 K1032 R1033 R1034 K1035 I1036 T1037 Q1038 G1039 D1040 D1041 L1042 A1043 P1044 G1045 V1046 L1047 K1048 I1049 V1050 K1051 V1052 Y1053 L1054 A1055 V1056 K1057 R1058 R1059 I1060 Q1061 P1062 G1063 D1064 K1065 M1066 A1067 G1068 R1069 H1070 G1071 N1072 K1073 G1074 V1075 I1076 S1077 K1078 I1079 N1080 P1081

I1082 E1083 D1084 M1085 P1086 Y1087 D1088 E1089 N1090 G1091 T1092 P1093 V1094 D1095 I1096 V1097 L1098 N1099 P1100 D1160 L1101 G1102 V1103 P1104 S1105 R1106 M1107 N1108 I1109 G1110 Q1111 I1112 L1113 E1114 A1055 V1056 K1057 R1058 R1059 I1060 Q1061 P1062 G1063 D1064 K1065 M1066 A1067 G1068 R1069 H1070 G1071 N1072 K1073 G1074 Q1134 Q1135 Q1136 E1137 V1138 A1139 K1140 L1141

R1142 E1143 F1144 I1145 Q1146 R1147 A1148 Y1149 D1150 L1151 G1152 A1153 D1154 V1155 R1156 Q1157 K1158 V1159 D1160 L1161 S1162 T1163 F1164 S1165 D1166 E1167 E1168 V1169 M1170 R1171 L1172 A1173 E1174 N1175 L1176 R1177 K1178 G1179 M1180 P1181 I1182 A1183 T1184 P1185 V1186 F1187 D1188 G1189 A1190 K1191 E1192 A1193 E1194 I1195 K1196 E1197 L1198 L1199 K1200 L1201

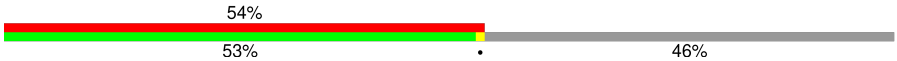
G1202 D1203 L1204 P1205 T1206 S1207 G1208 Q1209 I1210 R1211 L1212 Y1213 D1214 G1215 R1216 T1217 G1218 E1219 Q1220 F1221 E1222 R1223 P1224 V1225 T1226 V1227 G1228 Y1229 M1230 Y1231 M1232 L1233 K1234 L1235 N1236 H1237 L1238 V1239 D1240 D1241 K1242 M1243 H1244 A1245 R1246 S1247 T1248 G1249 S1250 Y1251 S1252 L1253 V1254 T1255 Q1256 Q1257 P1258 L1259 G1260 G1261

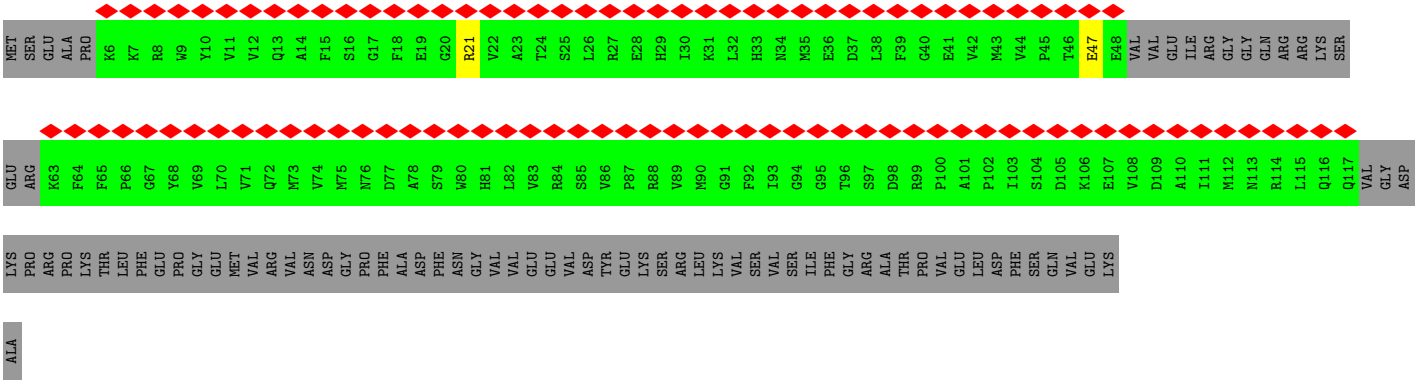
K1262 A1263 Q1264 F1265 G1266 G1267 Q1268 R1269 F1270 G1271 E1272 M1273 E1274 V1275 W1276 A1277 L1278 E1279 A1280 Y1281 G1282 A1283 A1284 Y1285 T1286 L1287 Q1288 E1289 M1290 L1291 T1292 V1293 K1294 S1295 D1296 D1297 V1298 N1299 G1300 R1301 T1302 K1303 M1304 Y1305 K1306 N1307 I1308 V1309 D1310 G1311 N1312 H1313 Q1314 M1315 E1316 P1317 G1318 M1319 P1320 E1321

S1322 F1323 N1324 V1325 L1326 L1327 K1328 E1329 I1330 R1331 S1332 L1333 G1334 I1335 N1336 I1337 E1338 L1339 E1340 D1341 E1342

• Molecule 12: Transcription termination/antitermination protein NusG

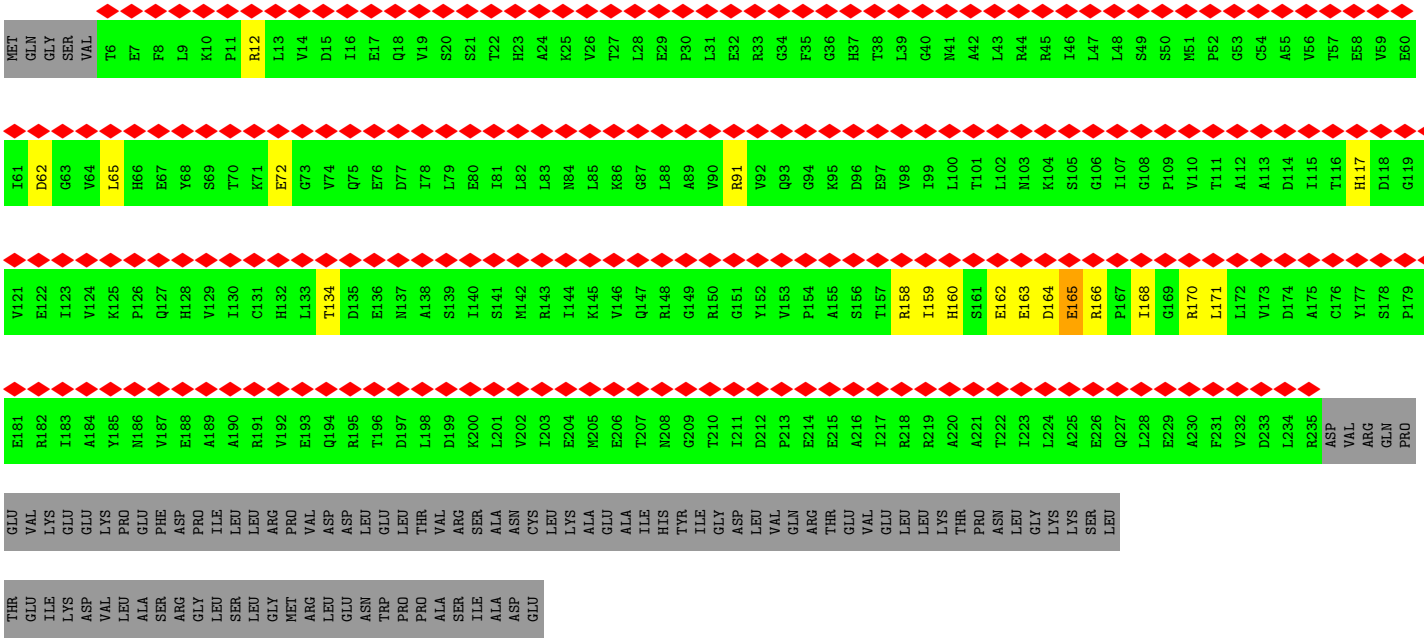
Chain AB:





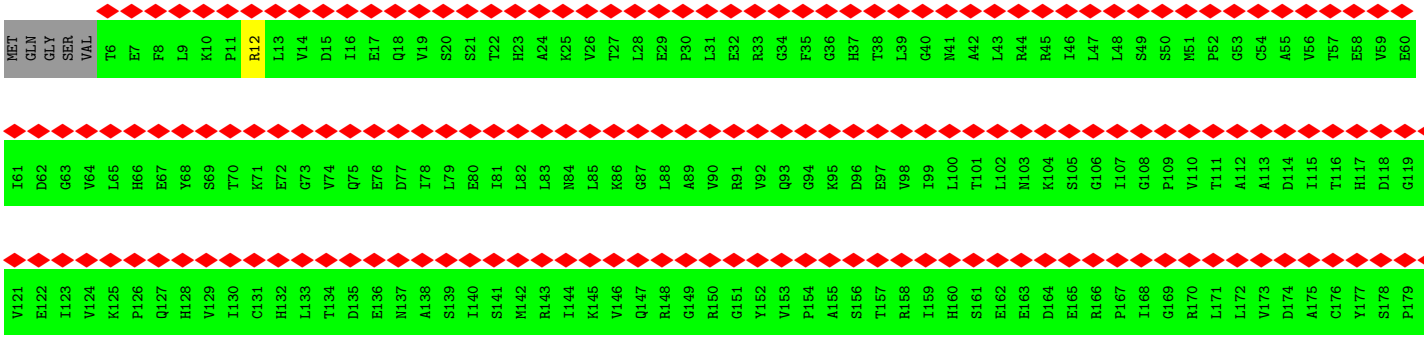
• Molecule 13: DNA-directed RNA polymerase subunit alpha

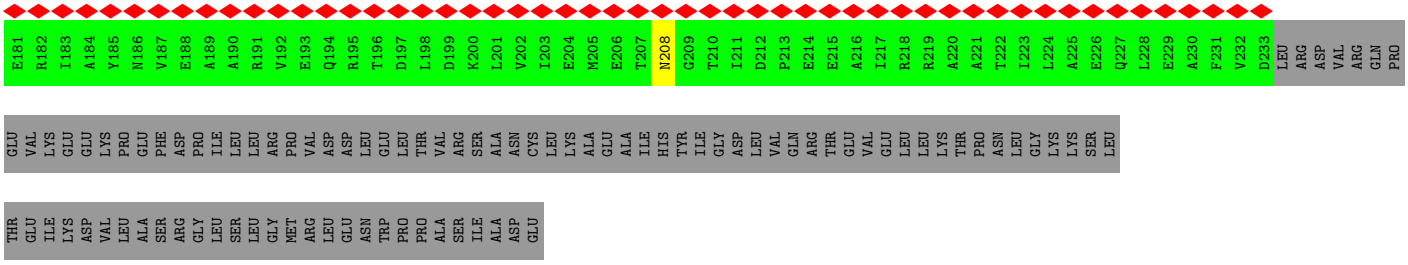
Chain AC:



• Molecule 13: DNA-directed RNA polymerase subunit alpha

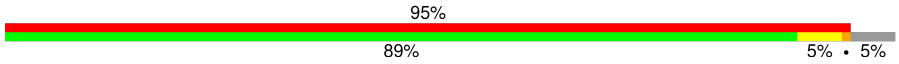
Chain AD:

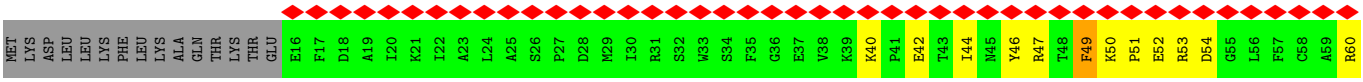


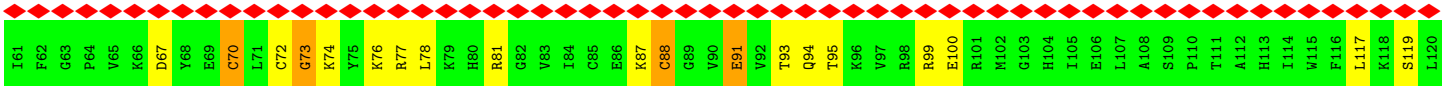


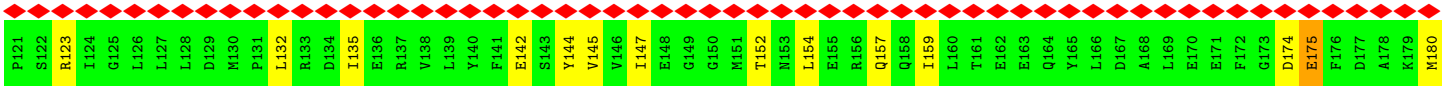
• Molecule 14: DNA-directed RNA polymerase subunit beta'

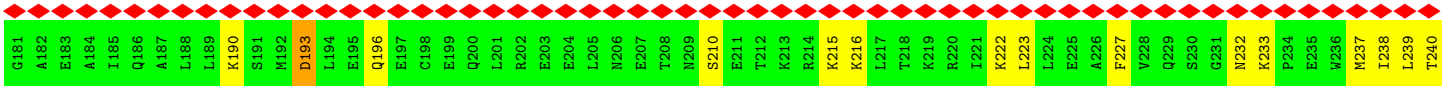
Chain AE:

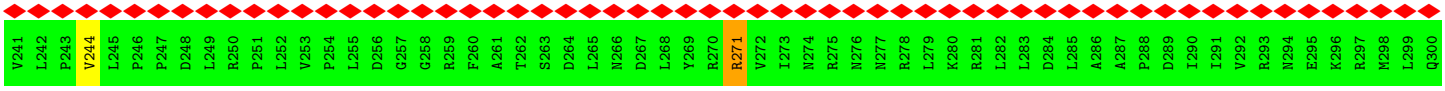


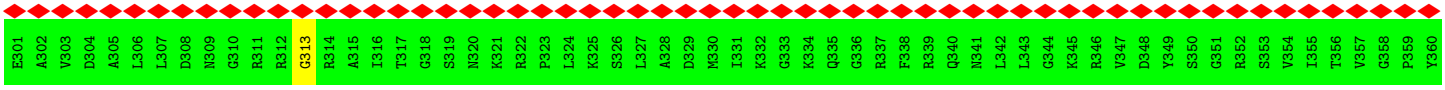


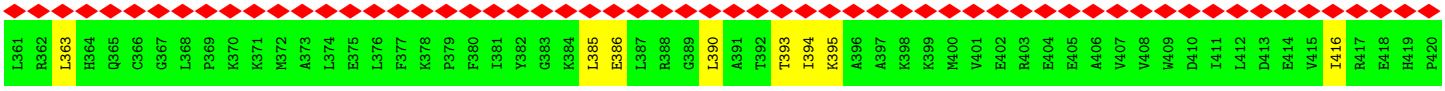


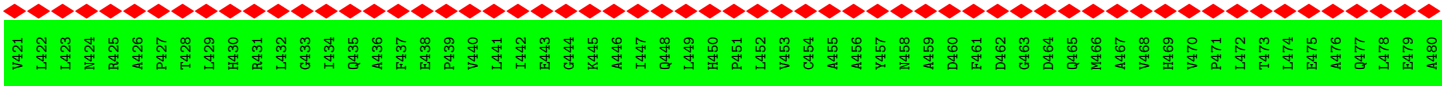


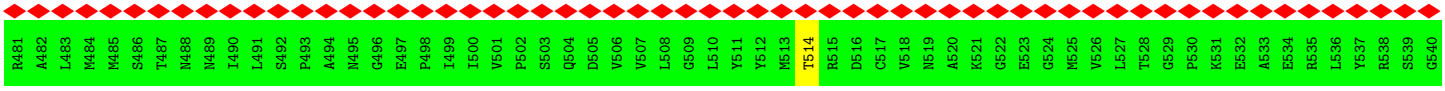


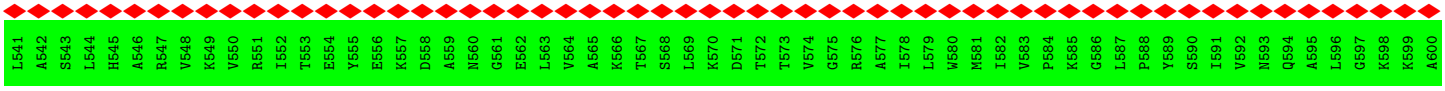


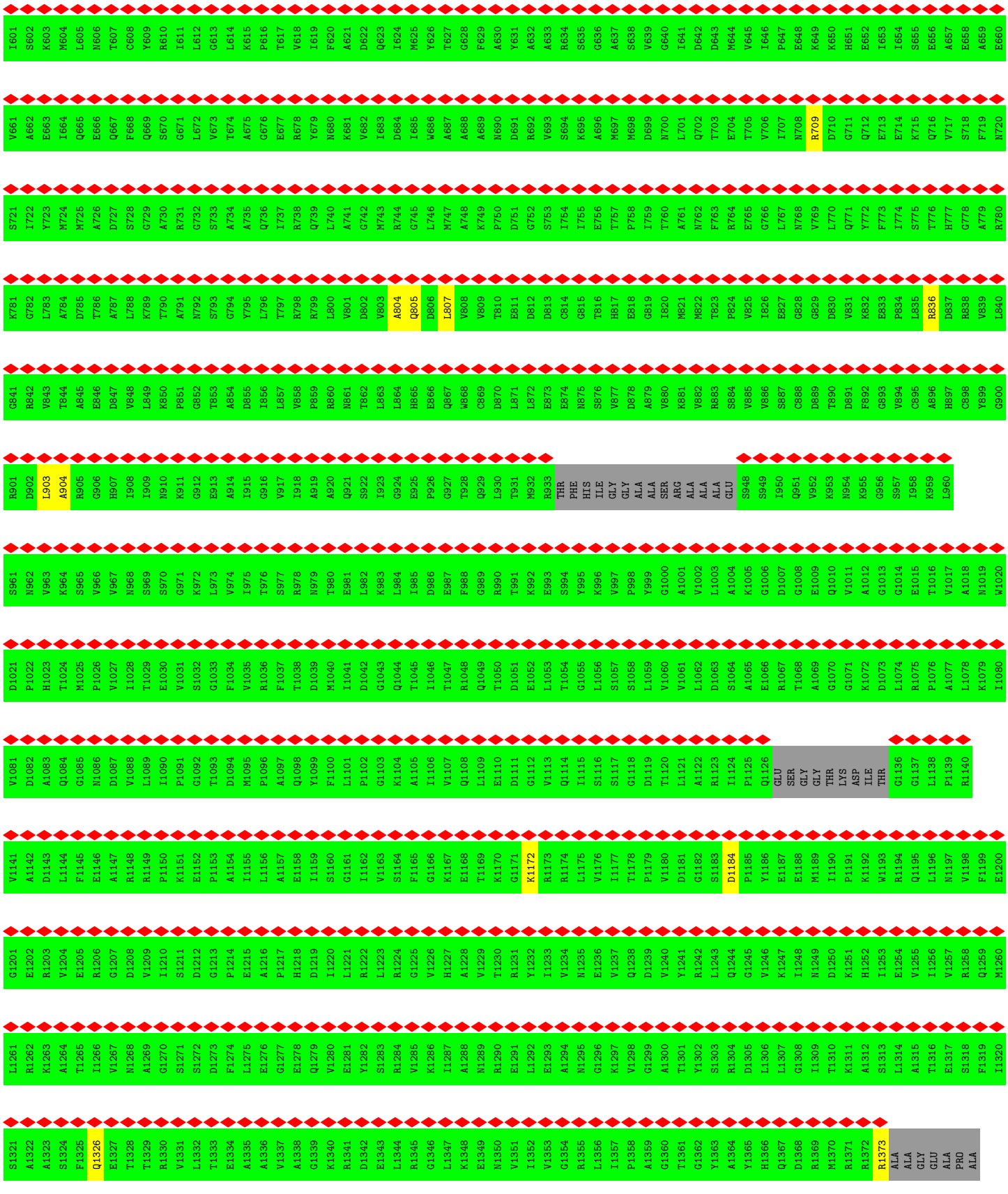








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S961 N962 V963 K964 S965 V966 V967 N968 S969 S970 G971 K972 L973 V974 I975 T976 S977 R978 N979 T980 E981 L982 K983 L984 I985 D986 E987 F988 G989 R990 T991 K992 E993 S994 Y995 K996 V997 P998 Y999 G1000 A1001 V1002 L1003 A1004 K1005 G1006 D1007 G1008 E1009 Q1010 V1011 A1012 G1013 G1014 E1015 T1016 V1017 A1018 N1019 W1020
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G1201 E1202 R1203 V1204 E1205 R1206 G1207 D1208 V1209 I1210 S1211 D1212 G1213 P1214 E1215 A1216 P1217 H1218 D1219 I1220 L1221 R1222 L1223 R1224 G1225 V1226 H1227 A1228 V1229 T1230 R1231 Y1232 I1233 V1234 N1235 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
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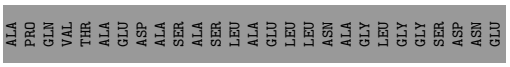
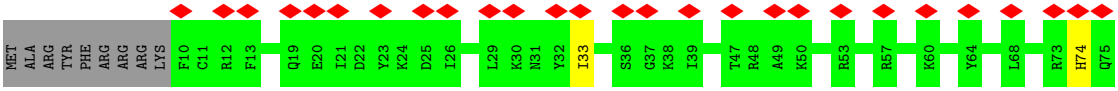
S1321 A1322 A1323 S1324 F1325 Q1326 E1327 T1328 T1329 R1330 V1331 L1332 T1333 E1334 A1335 A1336 V1337 A1338 G1339 K1340 R1341 D1342 E1343 L1344 R1345 G1346 L1347 K1348 E1349 N1350 V1351 I1352 V1353 G1354 R1355 L1356 I1357 P1358 A1359 G1360 T1361 G1362 Y1363 A1364 Y1365 H1366 Q1367 D1368 R1369 M1370 R1371 R1372 R1373 ALA ALA GLY GLU ALA PRO ALA



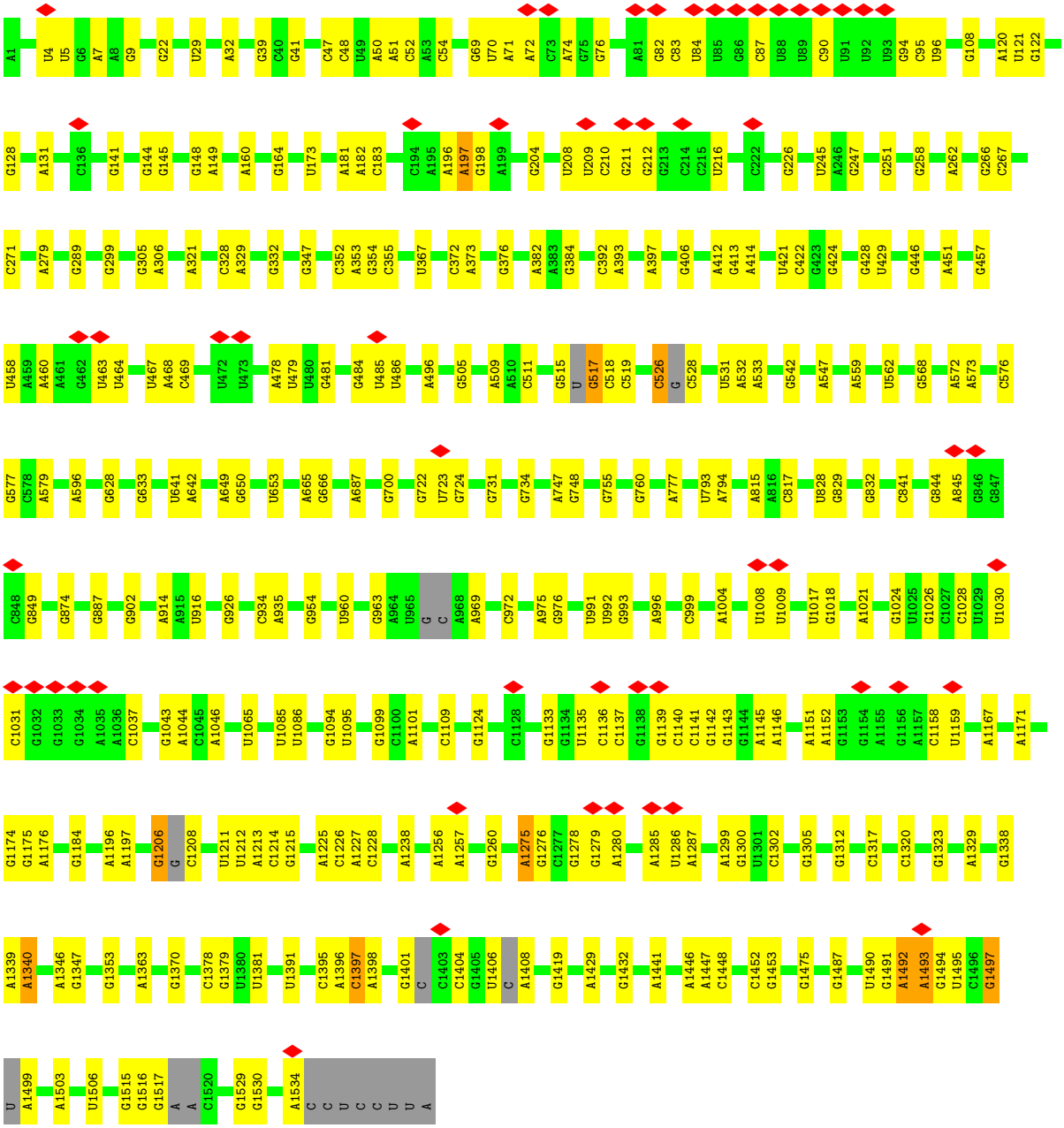
• Molecule 15: 30S ribosomal protein S18

Chain C:



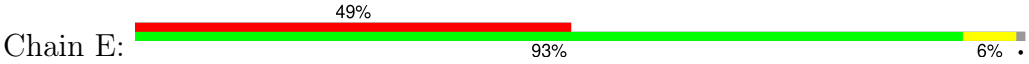
• Molecule 16: 16S rRNA

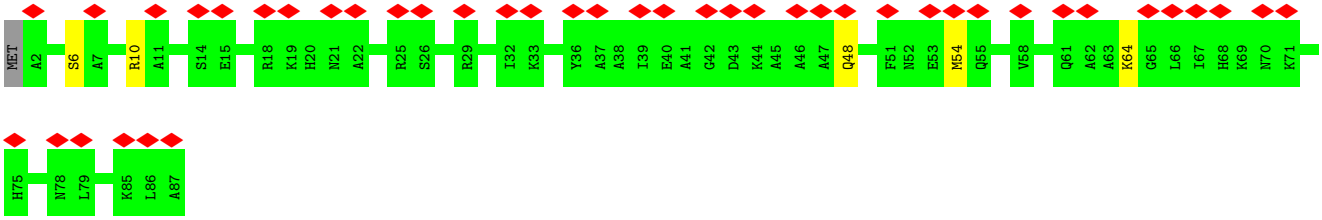
Chain D:



• Molecule 17: 30S ribosomal protein S20

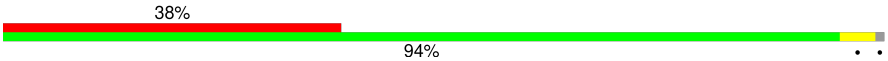
Chain E:

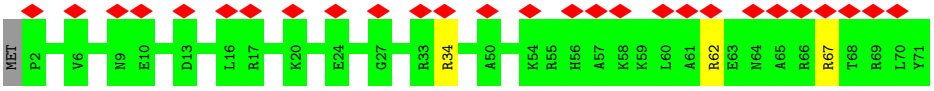




• Molecule 18: 30S ribosomal protein S21

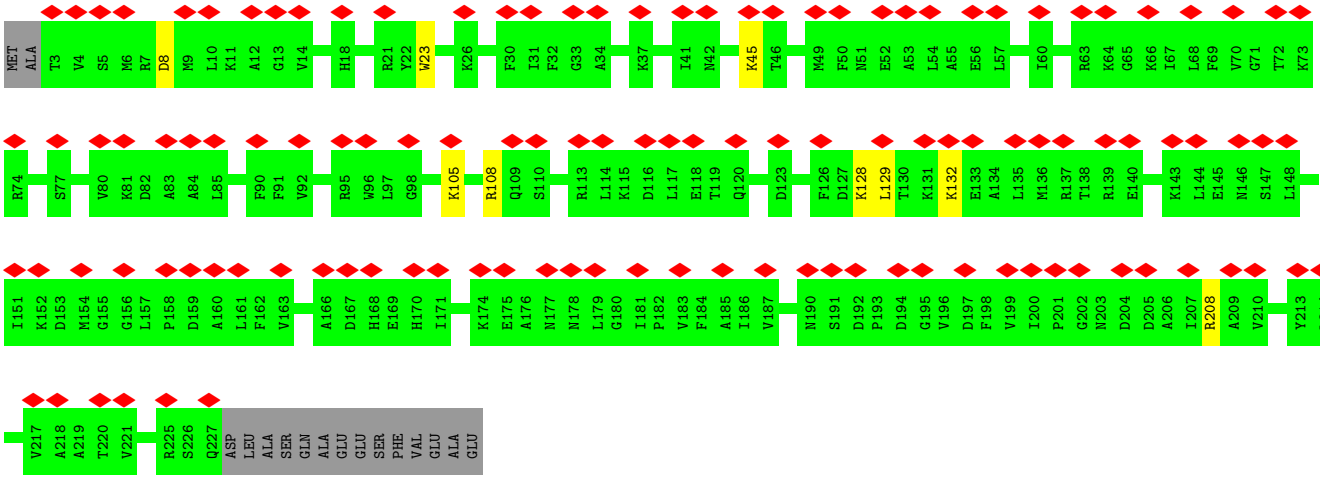
Chain F:





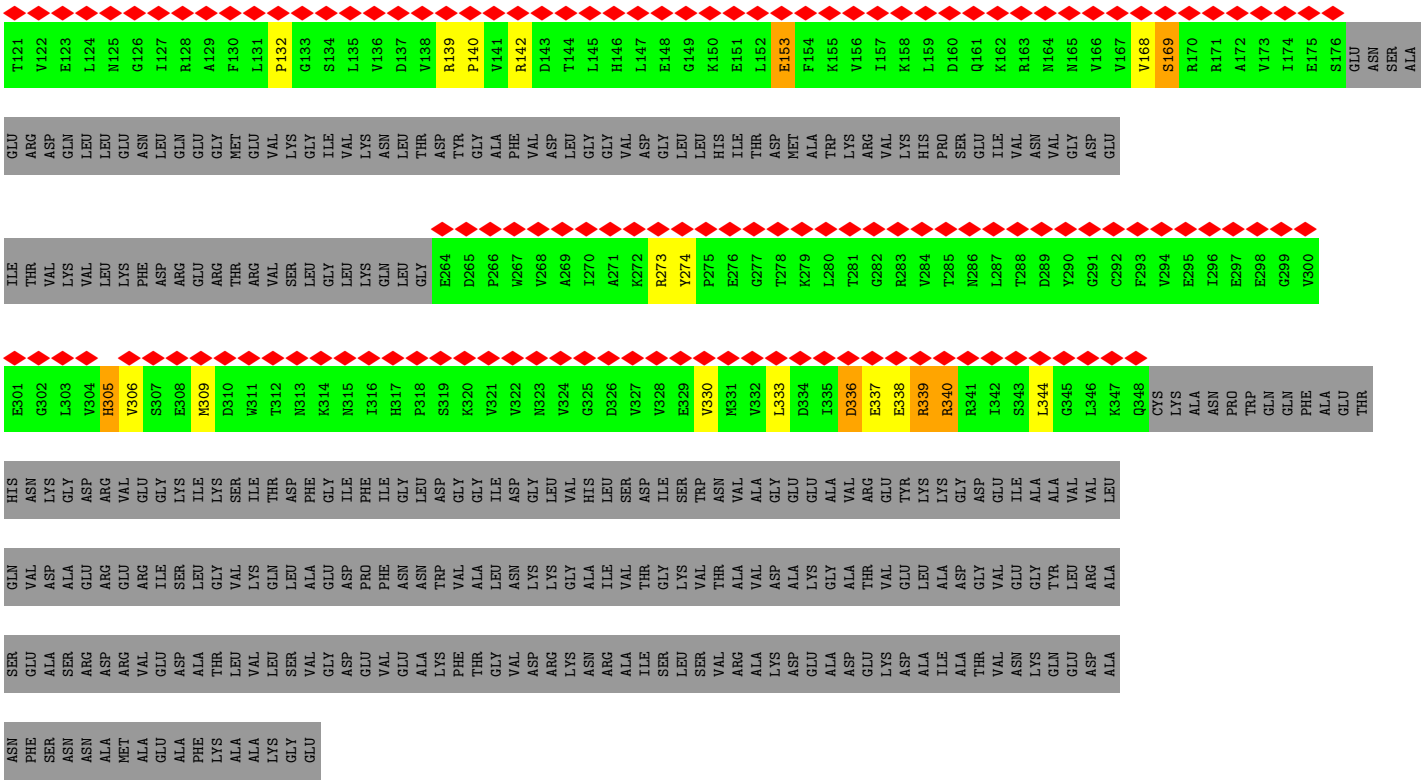
• Molecule 19: 30S ribosomal protein S2

Chain G:



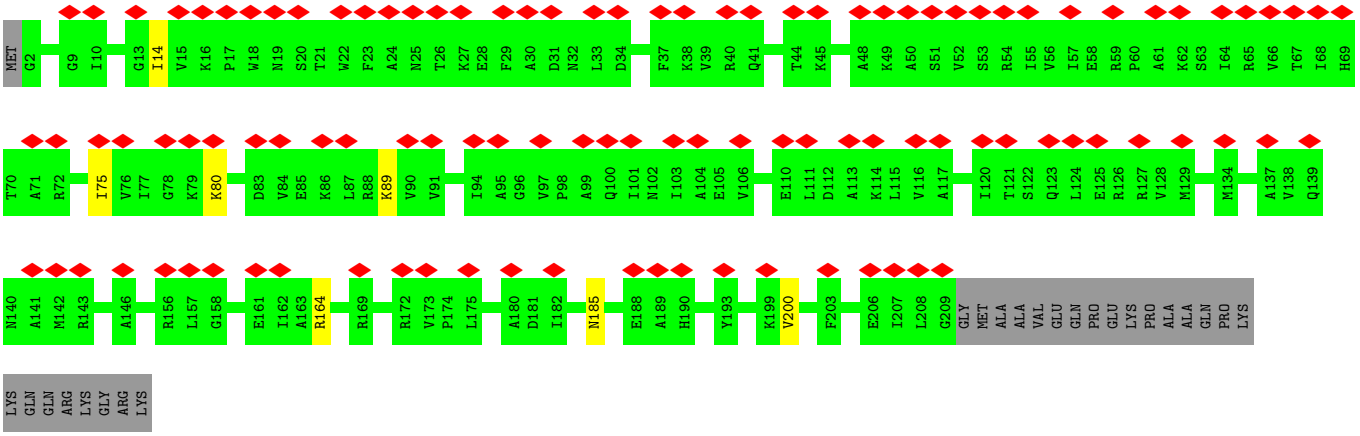
• Molecule 20: 30S ribosomal protein S1

Chain H:



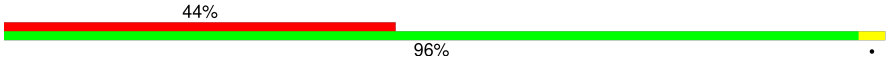
• Molecule 21: 30S ribosomal protein S3

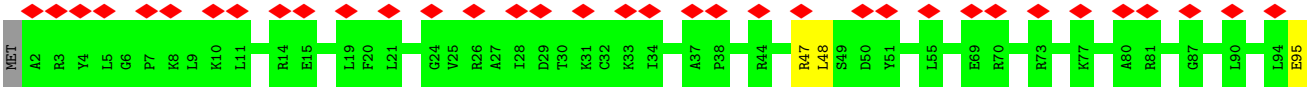
Chain I:

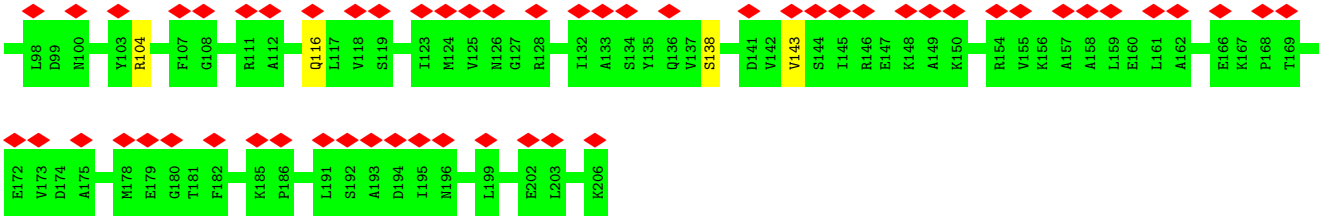


• Molecule 22: 30S ribosomal protein S4

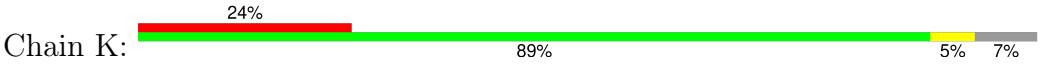
Chain J:

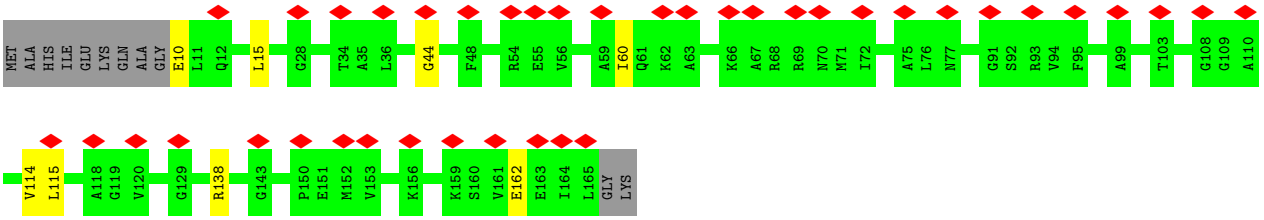




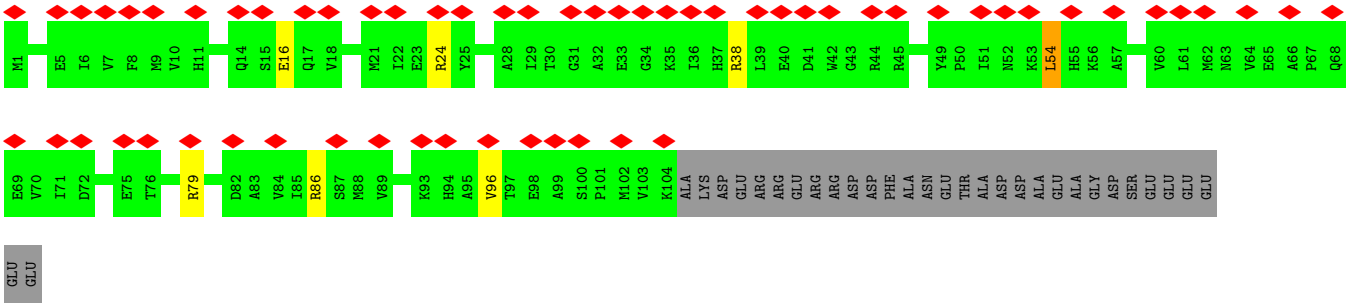


• Molecule 23: 30S ribosomal protein S5

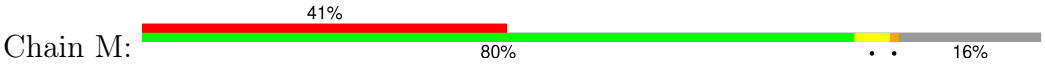


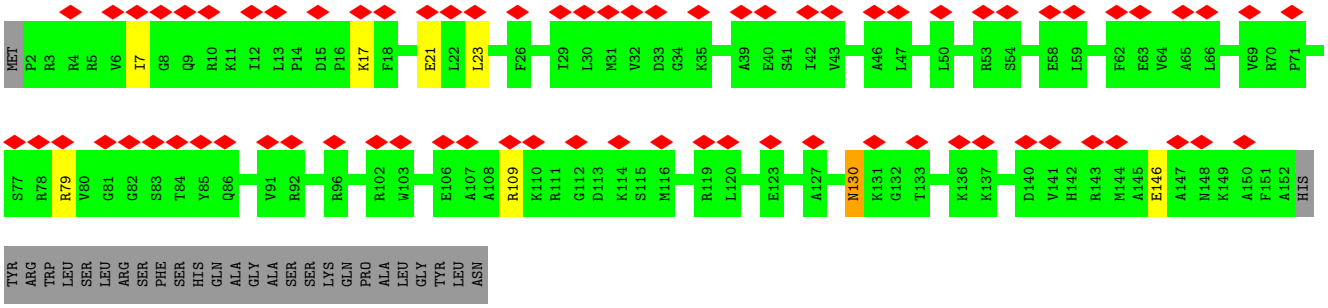


• Molecule 24: 30S ribosomal protein S6

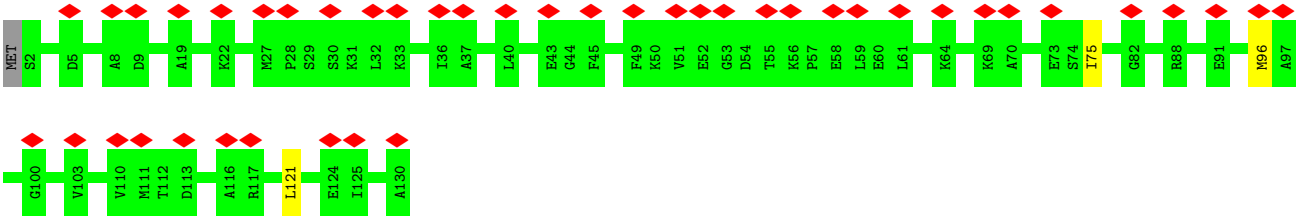


• Molecule 25: 30S ribosomal protein S7

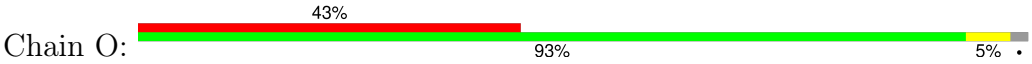




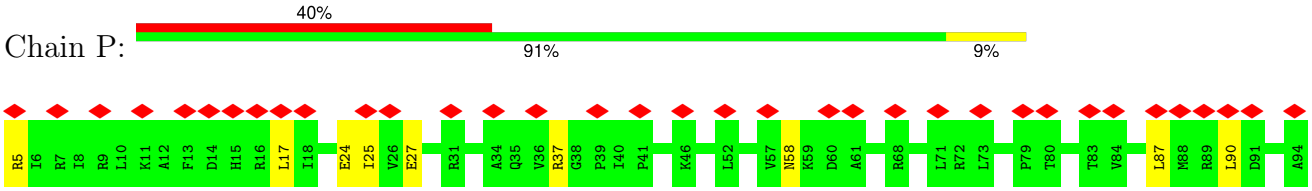
• Molecule 26: 30S ribosomal protein S8



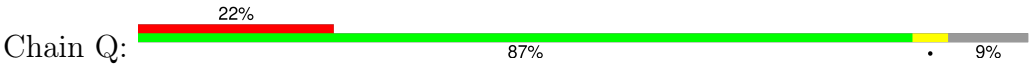
• Molecule 27: 30S ribosomal protein S9



• Molecule 28: 30S ribosomal protein S10



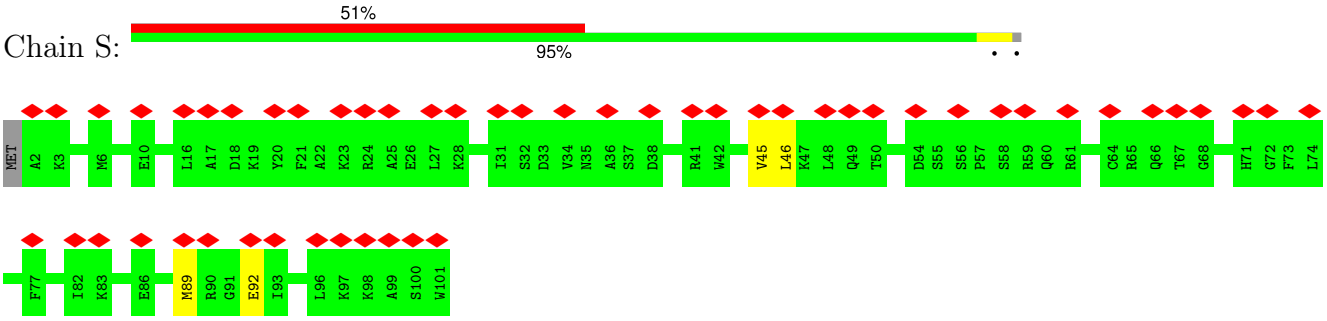
• Molecule 29: 30S ribosomal protein S11



• Molecule 30: 30S ribosomal protein S12

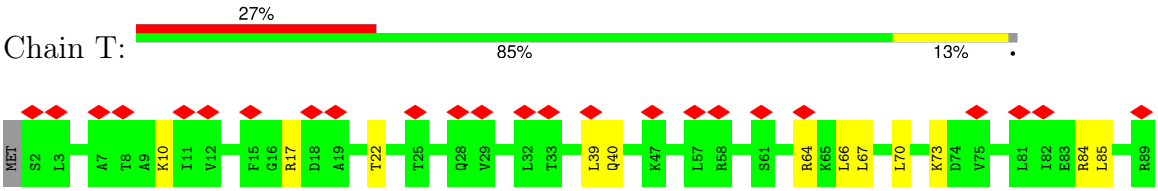
• Molecule 31: 30S ribosomal protein S14

Chain S:



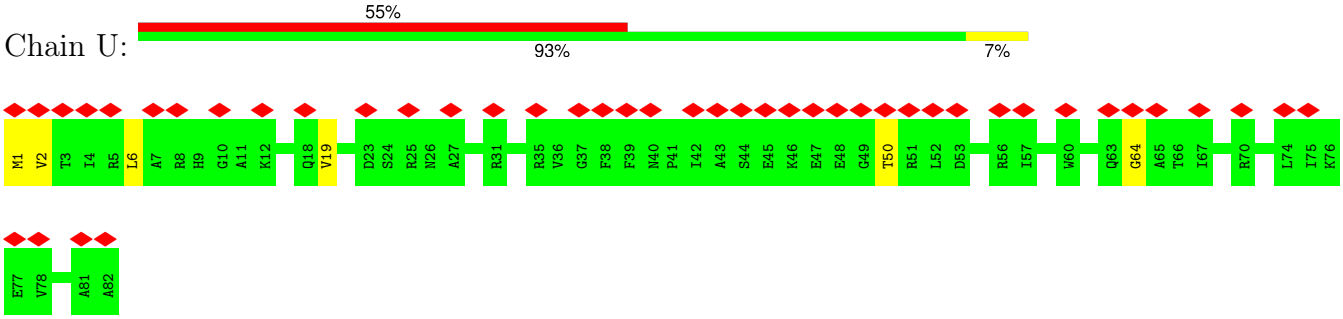
• Molecule 32: 30S ribosomal protein S15

Chain T:



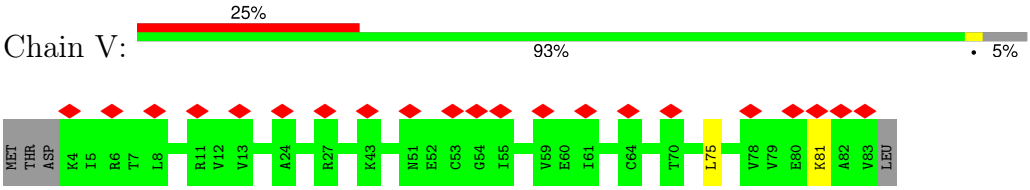
• Molecule 33: 30S ribosomal protein S16

Chain U:



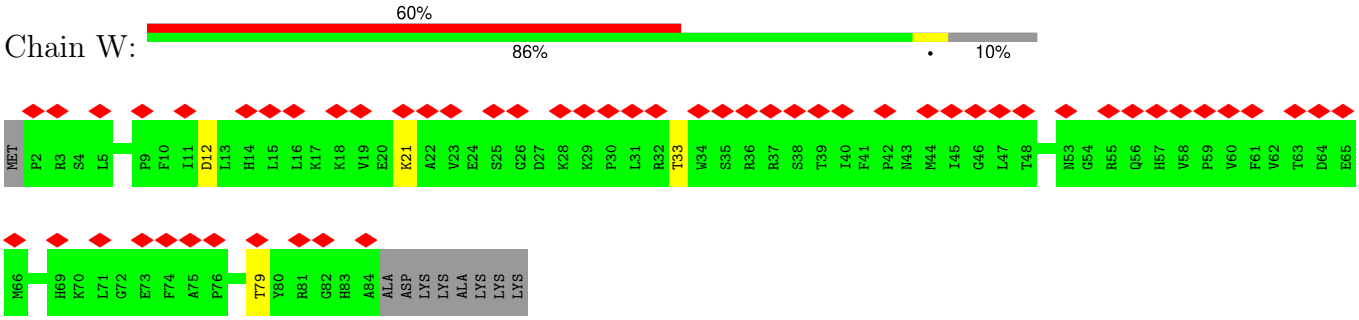
• Molecule 34: 30S ribosomal protein S17

Chain V:



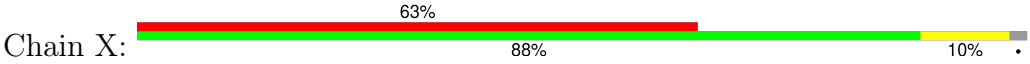
• Molecule 35: 30S ribosomal protein S19

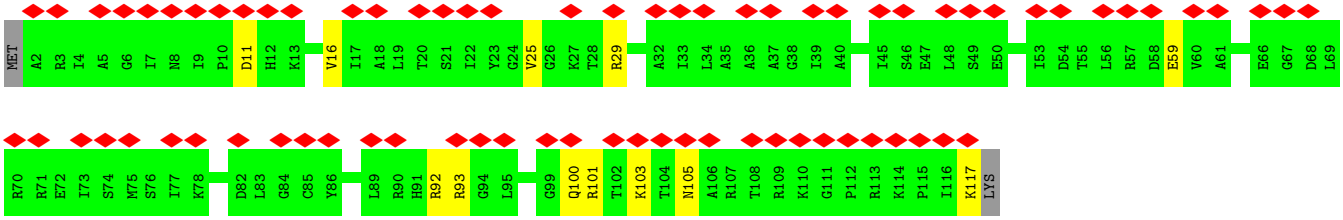
Chain W:



• Molecule 36: 30S ribosomal protein S13

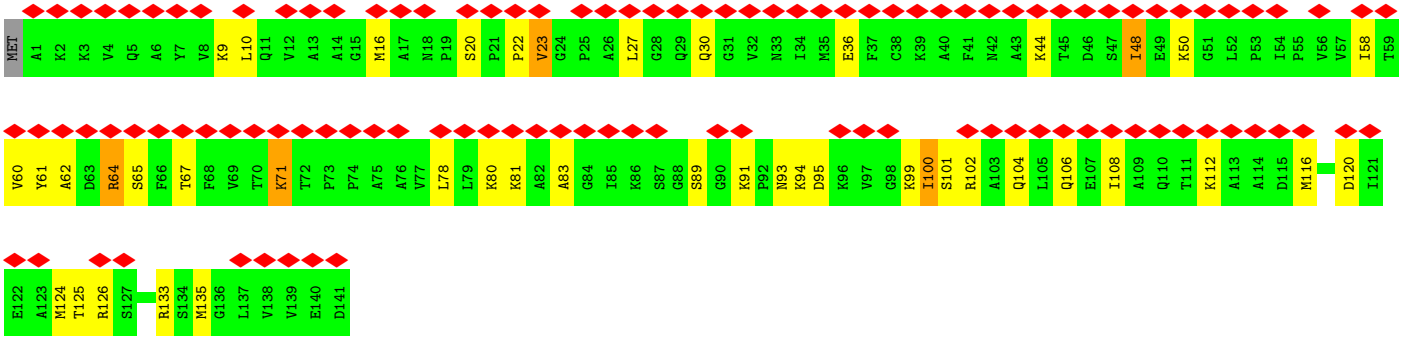
Chain X:





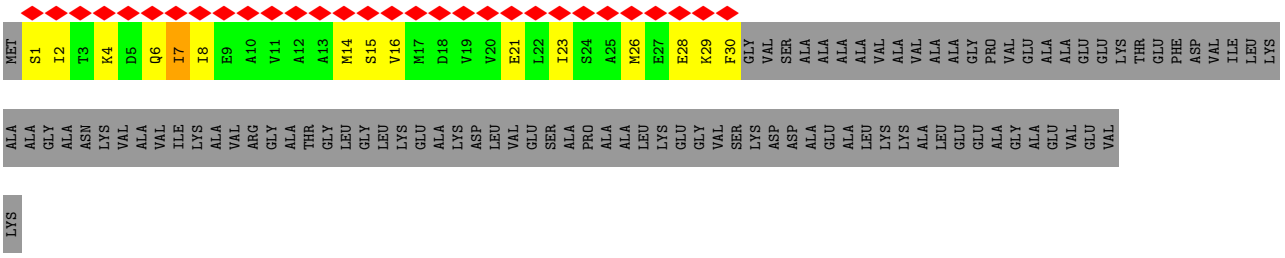
• Molecule 37: 50S ribosomal protein L11

Chain Y:



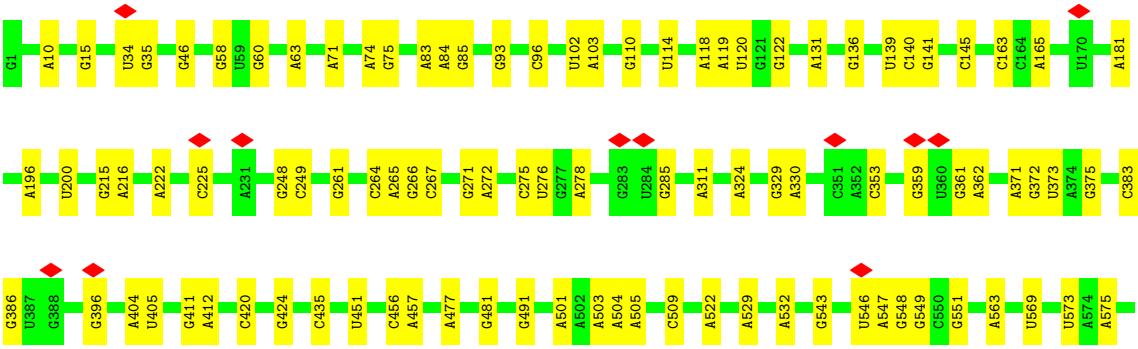
• Molecule 38: 50S ribosomal protein L7/L12

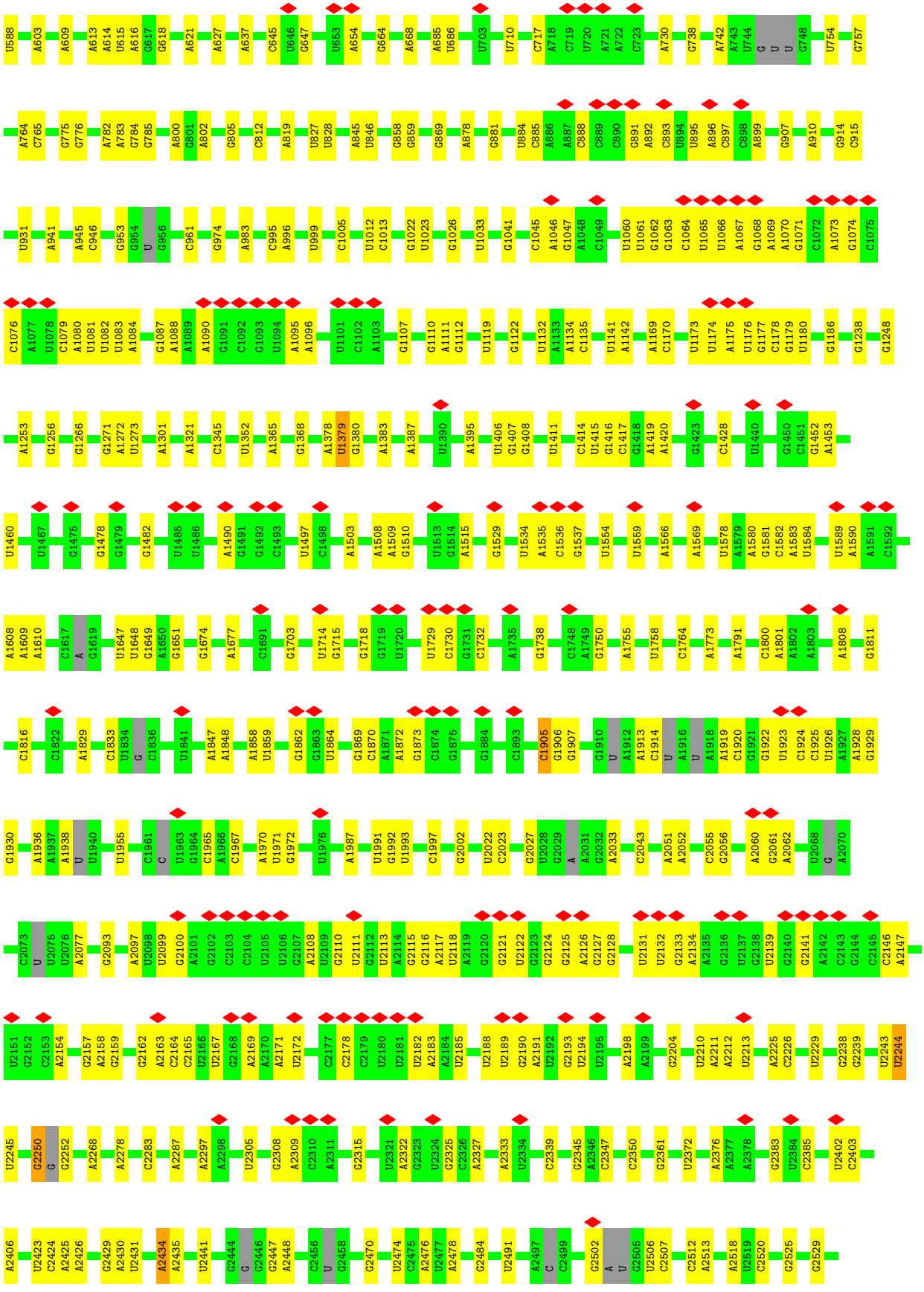
Chain Z:

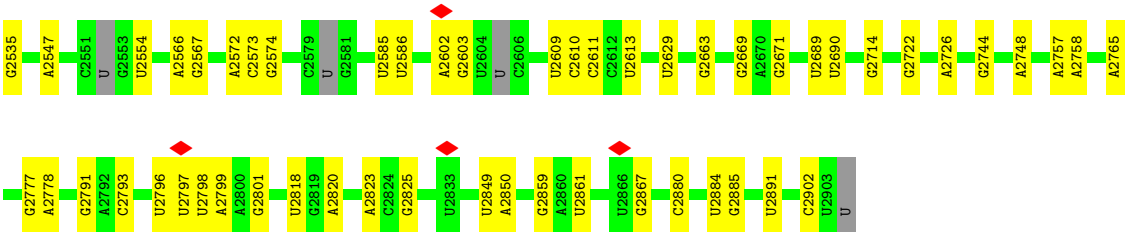


• Molecule 39: 23S rRNA

Chain a:

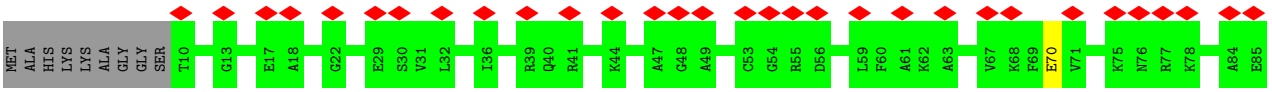






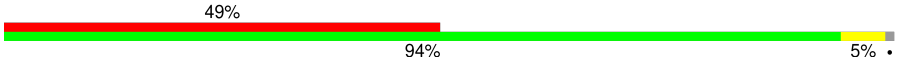
• Molecule 40: 50S ribosomal protein L27

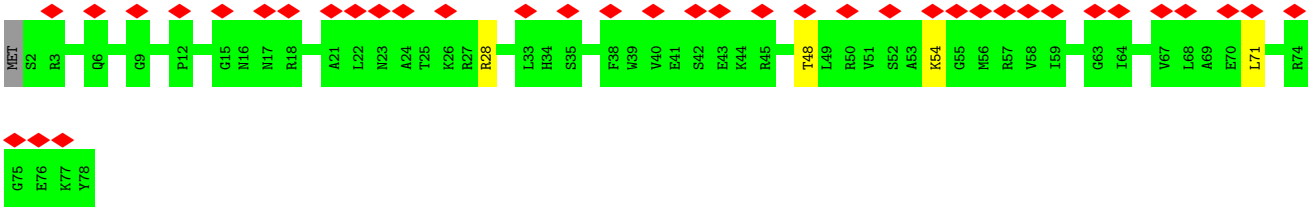
Chain b:



• Molecule 41: 50S ribosomal protein L28

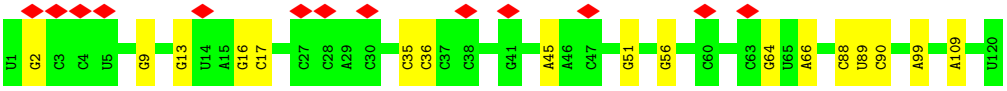
Chain c:





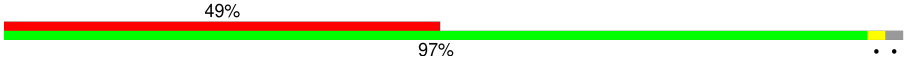
• Molecule 42: 5S rRNA

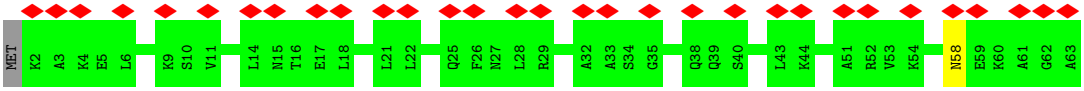
Chain d:



• Molecule 43: 50S ribosomal protein L29

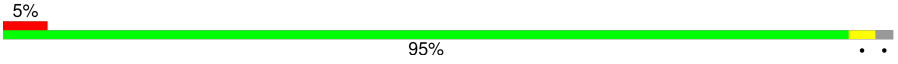
Chain e:

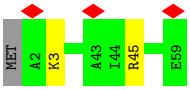




• Molecule 44: 50S ribosomal protein L30

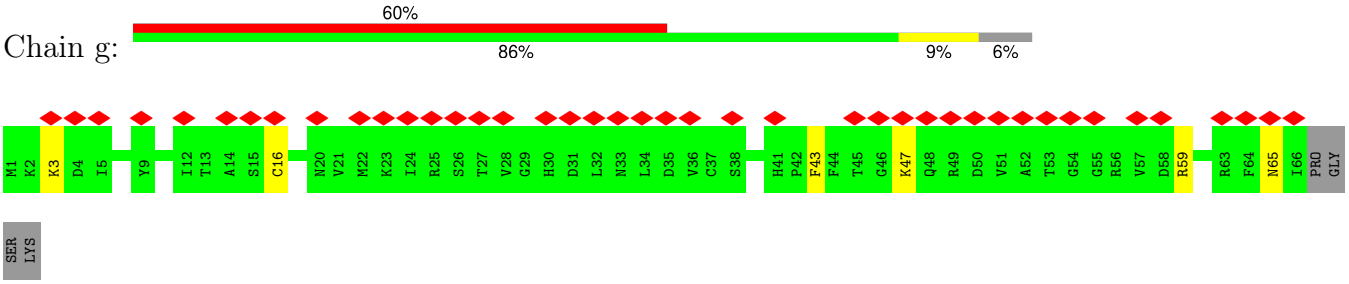
Chain f:





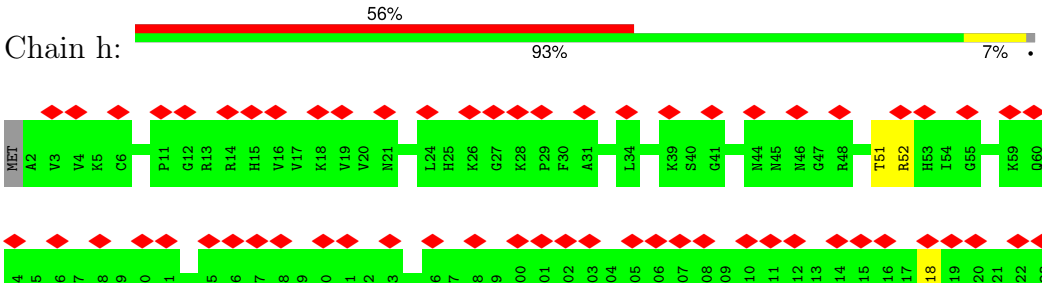
• Molecule 45: 50S ribosomal protein L31

Chain g:



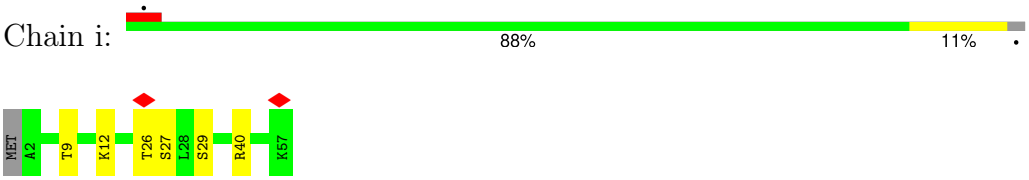
• Molecule 46: 50S ribosomal protein L2

Chain h:



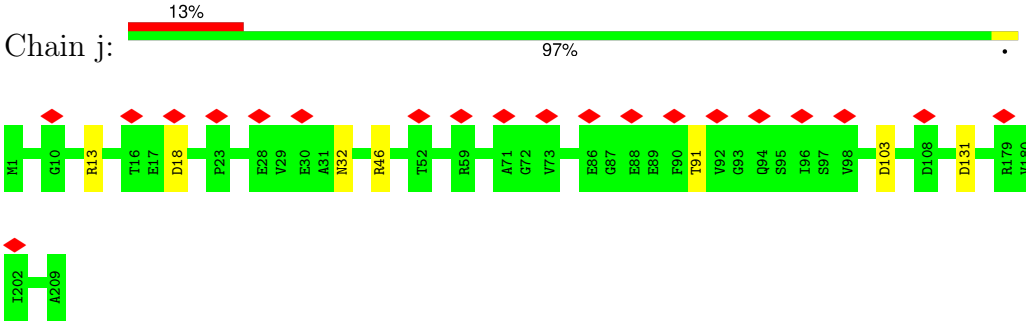
• Molecule 47: 50S ribosomal protein L32

Chain i:



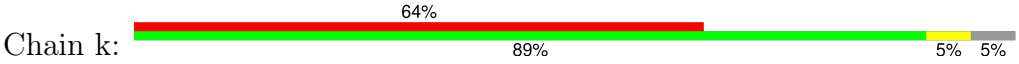
• Molecule 48: 50S ribosomal protein L3

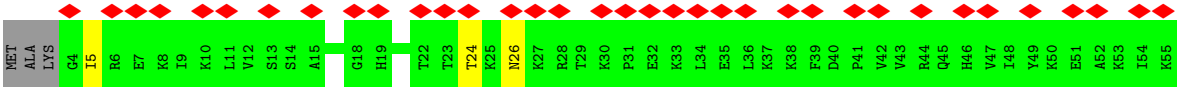
Chain j:



• Molecule 49: 50S ribosomal protein L33

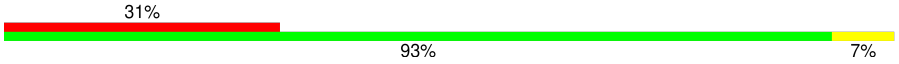
Chain k:

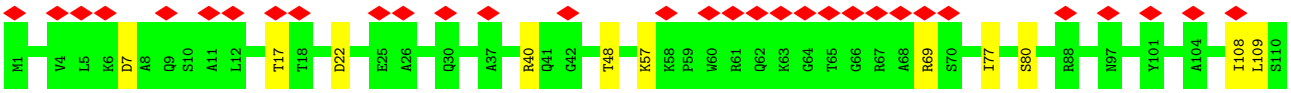


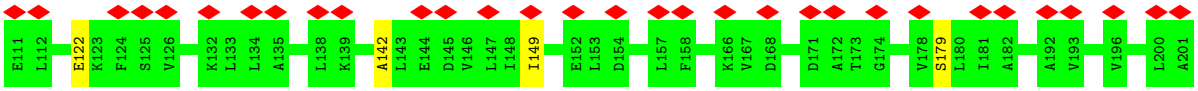


• Molecule 50: 50S ribosomal protein L4

Chain l:

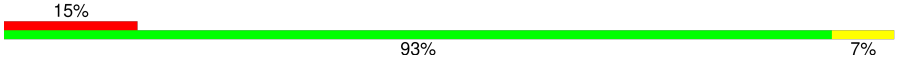


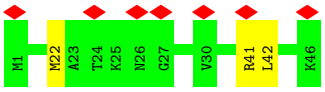




• Molecule 51: 50S ribosomal protein L34

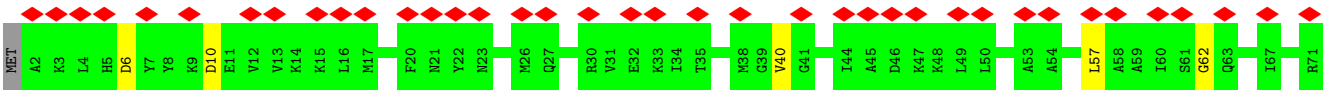
Chain m:

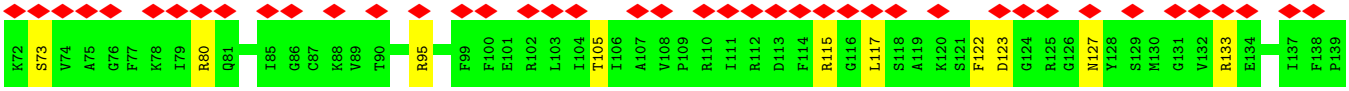


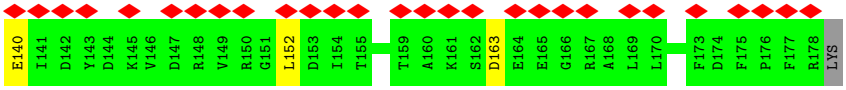


• Molecule 52: 50S ribosomal protein L5

Chain n:

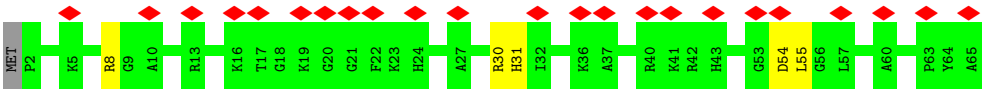






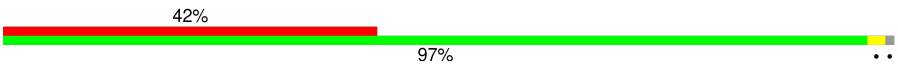
• Molecule 53: 50S ribosomal protein L35

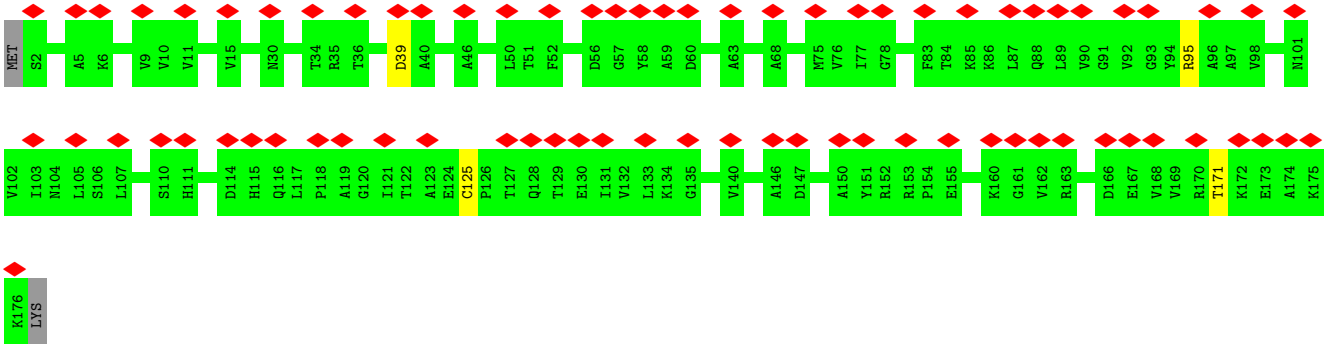
Chain o:



• Molecule 54: 50S ribosomal protein L6

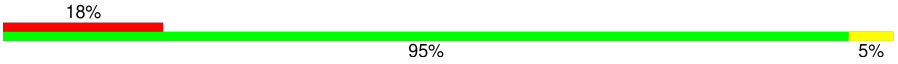
Chain p:

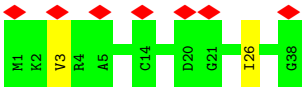




• Molecule 55: 50S ribosomal protein L36

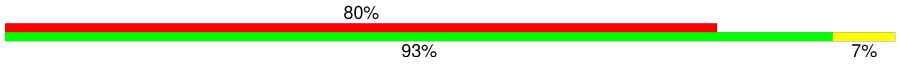
Chain q:

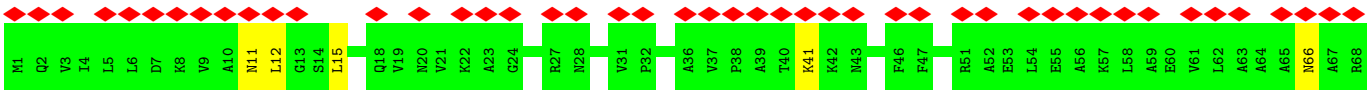


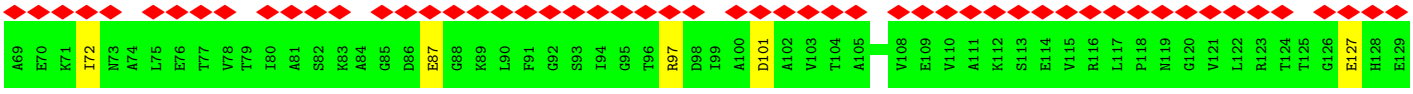


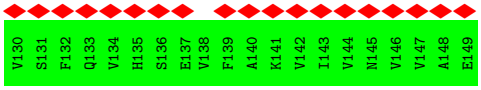
• Molecule 56: 50S ribosomal protein L9

Chain r:



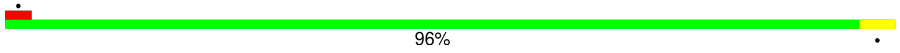


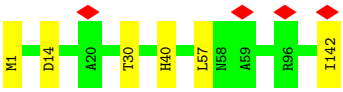




• Molecule 57: 50S ribosomal protein L13

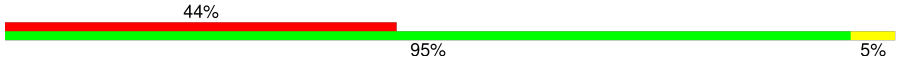
Chain s:

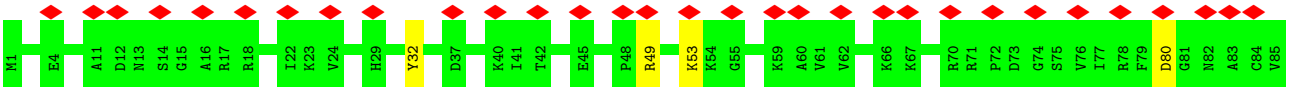


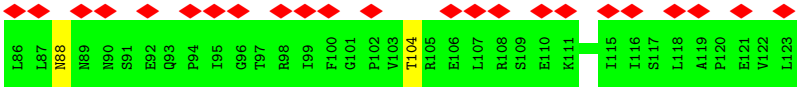


• Molecule 58: 50S ribosomal protein L14

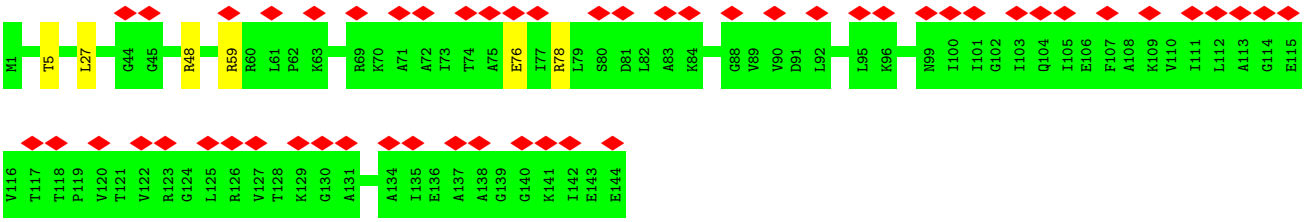
Chain t:



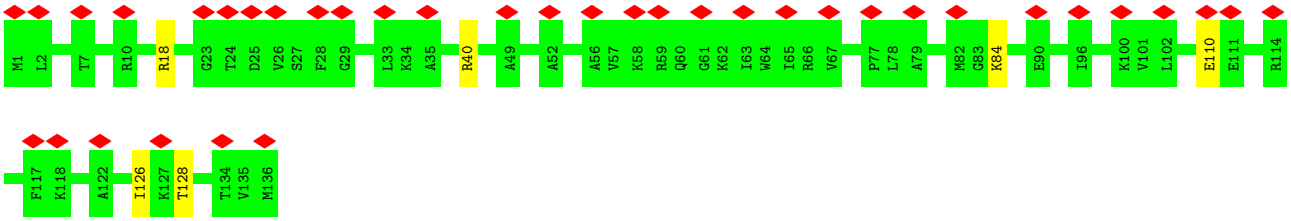




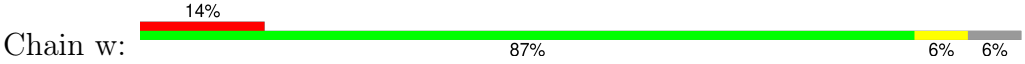
• Molecule 59: 50S ribosomal protein L15

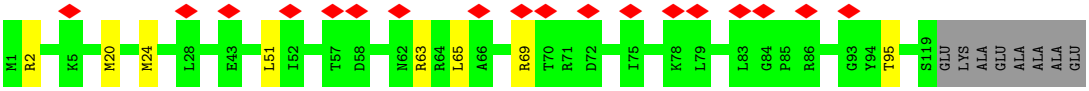


• Molecule 60: 50S ribosomal protein L16

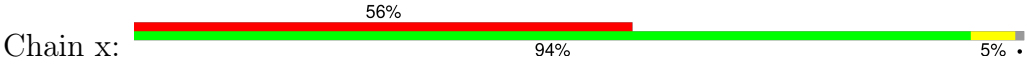


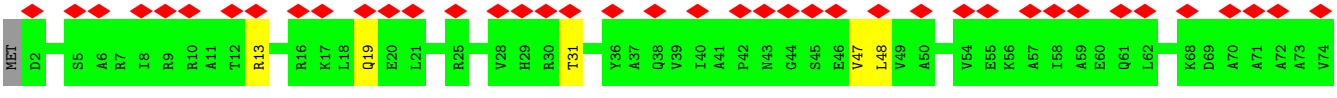
• Molecule 61: 50S ribosomal protein L17

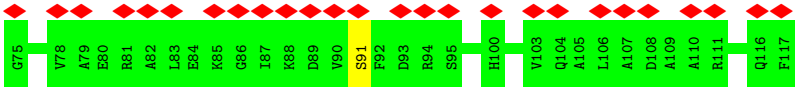




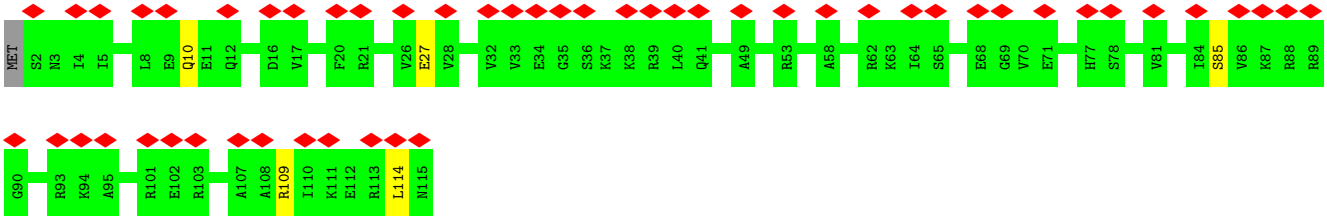
• Molecule 62: 50S ribosomal protein L18





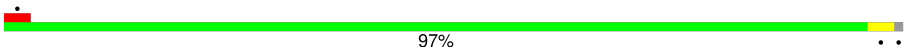


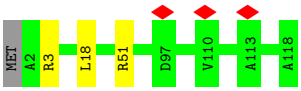
• Molecule 63: 50S ribosomal protein L19



• Molecule 64: 50S ribosomal protein L20

Chain z:





4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	27378	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 ($e^-/Å^2$)	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	0.074	Depositor
Minimum map value	-0.024	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.015	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

5.1 Standard geometry

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	0	0.38	0/829	0.67	0/1107
2	1	0.48	0/864	0.82	0/1156
3	2	0.42	0/752	0.71	0/1005
4	3	0.35	0/796	0.66	2/1062 (0.2%)
5	4	0.40	0/766	0.68	0/1025
6	5	1.12	6/528 (1.1%)	0.97	1/810 (0.1%)
7	6	1.11	4/603 (0.7%)	0.97	0/926
8	7	0.57	2/747 (0.3%)	0.88	3/1160 (0.3%)
9	9	0.79	2/1131 (0.2%)	0.64	1/1524 (0.1%)
10	A	0.39	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	0.56	0/2425
14	AE	0.52	3/10545 (0.0%)	0.66	5/14236 (0.0%)
15	C	0.48	0/553	0.83	0/743
16	D	0.34	10/36610 (0.0%)	0.74	30/57091 (0.1%)
17	E	0.57	0/675	0.85	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	0.43	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	0.76	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	0.49	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	0.66	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	17/107985 (0.0%)
40	b	0.39	0/589	0.70	0/779
41	c	0.48	0/635	0.81	1/848 (0.1%)
42	d	0.29	0/2872	0.70	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	0.65	0/576
50	l	0.46	0/1571	0.77	0/2113
51	m	0.53	0/380	0.99	0/498
52	n	0.49	0/1434	0.88	3/1926 (0.2%)
53	o	0.45	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	0.75	0/1551
58	t	0.41	0/955	0.78	0/1279
59	u	0.40	0/1062	0.76	0/1413
60	v	0.47	0/1093	0.81	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	0.91	0/1278
All	All	0.43	34/189180 (0.0%)	0.74	101/278836 (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	-13.47	1.45	1.61
16	D	1339	A	O3'-P	10.63	1.74	1.61
11	AA	374	GLU	C-N	10.46	1.54	1.34
14	AE	88	CYS	CB-SG	-10.16	1.65	1.82
6	5	109	DT	O3'-P	8.68	1.71	1.61
16	D	145	G	O3'-P	8.42	1.71	1.61
16	D	196	A	O3'-P	8.27	1.71	1.61
7	6	10	DG	C1'-N9	-8.26	1.35	1.47
11	AA	850	ILE	N-CA	-8.21	1.29	1.46
16	D	1275	A	O3'-P	7.74	1.70	1.61
39	a	2434	A	O3'-P	7.55	1.70	1.61
20	H	169	SER	N-CA	7.52	1.61	1.46
16	D	1395	C	O3'-P	7.28	1.69	1.61
6	5	121	DG	C1'-N9	-7.27	1.37	1.47
16	D	1515	G	O3'-P	-7.22	1.52	1.61
8	7	19	G	C1'-N9	-7.17	1.36	1.46
8	7	-10	U	C1'-N1	6.95	1.59	1.48
16	D	1490	U	O3'-P	6.79	1.69	1.61
6	5	112	DG	C1'-N9	-6.68	1.37	1.47
16	D	1492	A	O3'-P	6.58	1.69	1.61
39	a	1905	C	O3'-P	6.53	1.69	1.61
6	5	100	DA	C1'-N9	-6.47	1.38	1.47
39	a	2167	U	O3'-P	6.46	1.68	1.61
7	6	21	DA	C1'-N9	-6.41	1.38	1.47
14	AE	93	THR	CA-C	6.20	1.69	1.52
9	9	129	LEU	C-N	6.12	1.45	1.34
6	5	116	DG	C1'-N9	-6.08	1.38	1.47
6	5	115	DA	C1'-N9	-5.99	1.38	1.47
14	AE	70	CYS	CA-CB	-5.83	1.41	1.53
10	B	36	U	O3'-P	5.74	1.68	1.61
7	6	28	DA	C1'-N9	-5.72	1.39	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	D	1397	C	O3'-P	5.66	1.68	1.61
7	6	24	DT	C1'-N1	5.32	1.56	1.49

All (101) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	D	1516	G	P-O3'-C3'	-18.97	96.94	119.70
16	D	1516	G	O3'-P-O5'	13.79	130.20	104.00
11	AA	1250	SER	C-N-CA	11.14	149.56	121.70
39	a	2252	G	N9-C1'-C2'	-10.94	99.78	114.00
16	D	1401	G	N9-C1'-C2'	-10.67	100.13	114.00
52	n	73	SER	N-CA-CB	-10.61	94.59	110.50
16	D	1499	A	N9-C1'-C2'	-10.32	100.58	114.00
16	D	528	C	N1-C1'-C2'	-10.20	100.75	114.00
20	H	169	SER	N-CA-C	9.96	137.89	111.00
16	D	1339	A	P-O3'-C3'	9.86	131.53	119.70
10	B	29	G	N9-C1'-C2'	-9.73	101.30	112.00
10	B	28	C	P-O3'-C3'	9.59	131.20	119.70
14	AE	271	ARG	NE-CZ-NH2	-9.41	115.59	120.30
16	D	196	A	P-O3'-C3'	9.39	130.97	119.70
11	AA	375	PRO	CA-N-CD	-9.27	98.52	111.50
16	D	526	C	N1-C1'-C2'	-8.81	102.31	112.00
20	H	88	LYS	C-N-CA	8.76	143.59	121.70
39	a	2167	U	P-O3'-C3'	8.59	130.00	119.70
16	D	1208	C	N1-C1'-C2'	-8.56	102.58	112.00
16	D	1206	G	N9-C1'-C2'	-8.41	102.75	112.00
39	a	2434	A	P-O3'-C3'	8.28	129.63	119.70
9	9	130	PRO	CA-N-CD	-8.24	99.96	111.50
11	AA	995	ASP	O-C-N	-8.22	109.55	122.70
11	AA	376	PRO	N-CA-CB	-8.04	93.65	103.30
16	D	1406	U	N1-C1'-C2'	-7.78	103.44	112.00
39	a	1905	C	P-O3'-C3'	7.68	128.91	119.70
16	D	1275	A	P-O3'-C3'	7.64	128.87	119.70
16	D	1492	A	P-O3'-C3'	7.58	128.80	119.70
16	D	1490	U	P-O3'-C3'	7.54	128.75	119.70
20	H	305	HIS	N-CA-C	7.45	131.12	111.00
10	B	29	G	C3'-C2'-O2'	7.37	134.69	113.30
8	7	-11	A	OP2-P-O3'	7.21	121.07	105.20
16	D	1206	G	C4'-C3'-O3'	7.16	127.32	113.00
10	B	35	A	P-O3'-C3'	7.10	128.22	119.70
16	D	1493	A	C2'-C3'-O3'	7.10	125.12	109.50
39	a	2245	U	N1-C1'-C2'	-7.03	104.27	112.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	D	145	G	P-O3'-C3'	7.02	128.13	119.70
16	D	1516	G	OP1-P-O3'	-6.97	89.85	105.20
16	D	1395	C	P-O3'-C3'	6.97	128.06	119.70
11	AA	855	PRO	N-CA-CB	-6.84	95.08	102.60
8	7	-11	A	O3'-P-O5'	-6.79	91.11	104.00
52	n	73	SER	CB-CA-C	6.72	122.87	110.10
11	AA	995	ASP	CA-C-N	6.70	131.93	117.20
16	D	1515	G	O3'-P-O5'	-6.68	91.31	104.00
16	D	1401	G	C4'-C3'-O3'	6.65	126.31	113.00
39	a	2243	U	N1-C1'-C2'	-6.60	104.74	112.00
39	a	2250	G	C4'-C3'-O3'	-6.59	95.57	109.40
39	a	1379	U	C2'-C3'-O3'	6.55	124.17	113.70
11	AA	935	THR	CA-CB-OG1	-6.48	95.40	109.00
20	H	339	ARG	C-N-CA	6.45	137.84	121.70
16	D	1515	G	P-O3'-C3'	6.45	127.44	119.70
16	D	1408	A	N9-C1'-C2'	-6.38	104.98	112.00
16	D	515	G	N9-C1'-C2'	-6.38	104.99	112.00
6	5	109	DT	P-O3'-C3'	6.35	127.32	119.70
16	D	1497	G	N9-C1'-C2'	-6.34	105.03	112.00
10	B	34	C	P-O3'-C3'	6.34	127.31	119.70
13	AC	117	HIS	CB-CA-C	-6.21	97.97	110.40
11	AA	849	GLU	C-N-CA	6.15	137.06	121.70
11	AA	1004	ASP	CB-CA-C	5.97	122.35	110.40
11	AA	943	LYS	CA-C-O	-5.96	107.58	120.10
20	H	140	PRO	N-CA-CB	5.96	110.45	103.30
10	B	29	G	P-O3'-C3'	5.93	126.82	119.70
39	a	754	U	N1-C1'-C2'	5.90	121.67	114.00
20	H	330	VAL	N-CA-C	5.89	126.90	111.00
20	H	336	ASP	CB-CA-C	-5.88	98.63	110.40
11	AA	943	LYS	CA-C-N	5.87	130.12	117.20
11	AA	727	VAL	N-CA-C	-5.87	95.15	111.00
20	H	132	PRO	N-CA-CB	5.81	110.27	103.30
20	H	168	VAL	C-N-CA	5.78	136.16	121.70
14	AE	903	LEU	C-N-CA	5.77	136.13	121.70
16	D	517	G	C5'-C4'-C3'	5.70	125.12	116.00
20	H	344	LEU	CA-CB-CG	5.64	128.27	115.30
39	a	2244	U	C1'-C2'-O2'	-5.63	93.70	110.60
52	n	127	ASN	CB-CA-C	5.62	121.65	110.40
24	L	54	LEU	CA-CB-CG	5.57	128.12	115.30
14	AE	363	LEU	CA-CB-CG	5.56	128.09	115.30
11	AA	1233	LEU	CA-CB-CG	5.45	127.84	115.30
39	a	783	A	C4'-C3'-O3'	5.45	123.89	113.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	3	22	ARG	NE-CZ-NH1	5.34	122.97	120.30
16	D	1397	C	P-O3'-C3'	5.33	126.10	119.70
63	y	109	ARG	NE-CZ-NH2	5.33	122.96	120.30
16	D	1340	A	C5'-C4'-C3'	5.32	124.51	116.00
41	c	28	ARG	NE-CZ-NH2	-5.27	117.66	120.30
11	AA	728	ASP	N-CA-C	5.27	125.23	111.00
16	D	1340	A	C5'-C4'-O4'	5.24	115.39	109.10
39	a	742	A	C8-N9-C1'	-5.24	118.27	127.70
39	a	404	A	C2'-C3'-O3'	5.20	122.02	113.70
39	a	2244	U	C4'-C3'-O3'	5.19	123.38	113.00
11	AA	817	LEU	CB-CG-CD2	-5.18	102.19	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	-5.13	117.73	120.30
39	a	742	A	C4-N9-C1'	5.10	135.49	126.30
10	B	48	C	N1-C1'-C2'	5.07	120.59	114.00
39	a	2252	G	C4'-C3'-O3'	5.07	123.14	113.00
10	A	48	C	N1-C1'-C2'	5.06	120.57	114.00
14	AE	807	LEU	CB-CG-CD2	-5.04	102.42	111.00
14	AE	73	GLY	N-CA-C	5.04	125.71	113.10
16	D	197	A	C2'-C3'-O3'	5.03	121.75	113.70
39	a	1141	U	N1-C1'-C2'	5.02	120.53	114.00
20	H	153	GLU	N-CA-C	-5.01	97.48	111.00

There are no chirality outliers.

All (23) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
10	A	19	G	Sidechain
10	A	7	G	Sidechain
11	AA	1134	GLN	Peptide
11	AA	1157	GLN	Peptide
11	AA	1158	LYS	Peptide
11	AA	205	PRO	Peptide
11	AA	594	VAL	Peptide
11	AA	595	THR	Peptide
11	AA	596	ASP	Mainchain
11	AA	696	ASP	Peptide
11	AA	746	ALA	Peptide
11	AA	853	ASP	Mainchain
14	AE	1184	ASP	Peptide
14	AE	1326	GLN	Peptide

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Mol	Chain	Res	Type	Group
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%)	91 (99%)	1 (1%)	0	100 100
9	9	146/165 (88%)	95 (65%)	37 (25%)	14 (10%)	0 7
11	AA	1318/1341 (98%)	1150 (87%)	136 (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%)	14 (6%)	0	100 100
14	AE	1329/1407 (94%)	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	97/99 (98%)	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	9368/10481 (89%)	8607 (92%)	659 (7%)	102 (1%)	15	43

All (102) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
9	9	88	HIS
11	AA	596	ASP
11	AA	853	ASP
11	AA	859	GLU
11	AA	862	LEU
11	AA	873	ILE
11	AA	937	ASP
11	AA	993	PRO
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
13	AC	165	GLU
14	AE	51	PRO
14	AE	805	GLN
20	H	76	GLU
20	H	142	ARG
25	M	130	ASN
28	P	58	ASN
29	Q	119	ASN
36	X	105	ASN
37	Y	20	SER
37	Y	64	ARG
37	Y	106	GLN

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Mol	Chain	Res	Type
9	9	69	PHE
9	9	73	LYS
9	9	108	VAL
9	9	129	LEU
9	9	133	GLU
11	AA	850	ILE
11	AA	943	LYS
11	AA	995	ASP
14	AE	174	ASP
14	AE	193	ASP
20	H	82	THR
21	I	80	LYS
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
37	Y	22	PRO
37	Y	71	LYS
37	Y	89	SER
38	Z	7	ILE
4	3	39	ILE
9	9	28	ALA
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
9	9	54	VAL

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Mol	Chain	Res	Type
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	1140/1156 (99%)	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	1120/1168 (96%)	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
25	M	124/147 (84%)	116 (94%)	8 (6%)	14 41

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
26	N	104/105 (99%)	102 (98%)	2 (2%)	52 70
27	O	105/107 (98%)	100 (95%)	5 (5%)	21 48
28	P	86/86 (100%)	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%)	72 (66%)	37 (34%)	0 1
38	Z	26/85 (31%)	12 (46%)	14 (54%)	0 0
40	b	58/63 (92%)	57 (98%)	1 (2%)	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
58	t	104/104 (100%)	98 (94%)	6 (6%)	17 44

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
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	7791/8659 (90%)	7208 (92%)	583 (8%)	14 37

All (583) residues with a non-rotameric sidechain are listed below:

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

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

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

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

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Mol	Chain	Res	Type
11	AA	1023	HIS
11	AA	1024	GLU
11	AA	1025	PHE
11	AA	1026	GLU
11	AA	1027	LYS
11	AA	1029	LEU
11	AA	1032	LYS
11	AA	1034	ARG
11	AA	1035	LYS
11	AA	1038	GLN
11	AA	1041	ASP
11	AA	1042	LEU
11	AA	1046	VAL
11	AA	1047	LEU
11	AA	1048	LYS
11	AA	1151	LEU
11	AA	1159	VAL
11	AA	1250	SER
11	AA	1252	SER
11	AA	1253	LEU
11	AA	1254	VAL
11	AA	1256	GLN
11	AA	1259	LEU
12	AB	21	ARG
12	AB	47	GLU
13	AC	12	ARG
13	AC	62	ASP
13	AC	65	LEU
13	AC	72	GLU
13	AC	91	ARG
13	AC	134	THR
13	AC	158	ARG
13	AC	159	ILE
13	AC	160	HIS
13	AC	162	GLU
13	AC	163	GLU
13	AC	165	GLU
13	AC	166	ARG
13	AC	168	ILE
13	AC	170	ARG
13	AC	171	LEU
13	AD	12	ARG

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

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

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

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

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

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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 (6) such sidechains are listed below:

Mol	Chain	Res	Type
9	9	103	ASN
11	AA	1236	ASN
19	G	18	HIS
23	K	70	ASN
36	X	105	ASN
59	u	4	ASN

5.3.3 RNA

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	31/32 (96%)	21 (67%)	3 (9%)
All	All	4674/4750 (98%)	922 (19%)	50 (1%)

All (922) RNA backbone outliers are listed below:

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

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

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Mol	Chain	Res	Type
10	A	73	A
10	B	2	G
10	B	6	G
10	B	7	G
10	B	8	U
10	B	10	G
10	B	13	C
10	B	14	A
10	B	15	G
10	B	16	C
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

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Mol	Chain	Res	Type
16	D	39	G
16	D	41	G
16	D	47	C
16	D	48	C
16	D	50	A
16	D	51	A
16	D	52	C
16	D	54	C
16	D	69	G
16	D	70	U
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

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Mol	Chain	Res	Type
16	D	211	G
16	D	212	G
16	D	216	U
16	D	226	G
16	D	245	U
16	D	247	G
16	D	251	G
16	D	258	G
16	D	262	A
16	D	266	G
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

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Mol	Chain	Res	Type
16	D	446	G
16	D	451	A
16	D	457	G
16	D	458	U
16	D	460	A
16	D	463	U
16	D	464	U
16	D	467	U
16	D	468	A
16	D	469	C
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

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Mol	Chain	Res	Type
16	D	665	A
16	D	666	G
16	D	687	A
16	D	700	G
16	D	723	U
16	D	724	G
16	D	731	G
16	D	734	G
16	D	747	A
16	D	748	G
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

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Mol	Chain	Res	Type
16	D	996	A
16	D	999	C
16	D	1004	A
16	D	1008	U
16	D	1009	U
16	D	1017	U
16	D	1018	G
16	D	1021	A
16	D	1024	G
16	D	1026	G
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

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Mol	Chain	Res	Type
16	D	1174	G
16	D	1175	G
16	D	1176	A
16	D	1184	G
16	D	1196	A
16	D	1197	A
16	D	1206	G
16	D	1211	U
16	D	1212	U
16	D	1213	A
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

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Mol	Chain	Res	Type
16	D	1370	G
16	D	1378	C
16	D	1379	G
16	D	1381	U
16	D	1391	U
16	D	1396	A
16	D	1397	C
16	D	1398	A
16	D	1404	C
16	D	1419	G
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

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Mol	Chain	Res	Type
39	a	84	A
39	a	85	G
39	a	93	G
39	a	96	C
39	a	102	U
39	a	103	A
39	a	110	G
39	a	114	U
39	a	118	A
39	a	119	A
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

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Mol	Chain	Res	Type
39	a	329	G
39	a	330	A
39	a	353	C
39	a	359	G
39	a	361	G
39	a	362	A
39	a	371	A
39	a	372	G
39	a	373	U
39	a	375	G
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

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Mol	Chain	Res	Type
39	a	575	A
39	a	588	U
39	a	603	A
39	a	609	A
39	a	613	A
39	a	614	A
39	a	615	U
39	a	616	A
39	a	618	G
39	a	621	A
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

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Mol	Chain	Res	Type
39	a	869	G
39	a	878	A
39	a	881	G
39	a	884	U
39	a	885	C
39	a	888	C
39	a	891	G
39	a	892	A
39	a	893	C
39	a	895	U
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

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Mol	Chain	Res	Type
39	a	1063	G
39	a	1064	C
39	a	1065	U
39	a	1066	U
39	a	1067	A
39	a	1068	G
39	a	1069	A
39	a	1070	A
39	a	1071	G
39	a	1073	A
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

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Mol	Chain	Res	Type
39	a	1180	U
39	a	1186	G
39	a	1238	G
39	a	1248	G
39	a	1253	A
39	a	1256	G
39	a	1266	G
39	a	1271	G
39	a	1272	A
39	a	1273	U
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

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Mol	Chain	Res	Type
39	a	1509	A
39	a	1510	G
39	a	1515	A
39	a	1529	G
39	a	1534	U
39	a	1535	A
39	a	1536	C
39	a	1537	G
39	a	1554	U
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

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Mol	Chain	Res	Type
39	a	1791	A
39	a	1800	C
39	a	1801	A
39	a	1808	A
39	a	1811	G
39	a	1816	C
39	a	1829	A
39	a	1833	C
39	a	1847	A
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

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Mol	Chain	Res	Type
39	a	1991	U
39	a	1992	G
39	a	1993	U
39	a	1997	C
39	a	2002	G
39	a	2022	U
39	a	2023	C
39	a	2027	G
39	a	2033	A
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

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Mol	Chain	Res	Type
39	a	2141	G
39	a	2146	C
39	a	2147	A
39	a	2154	A
39	a	2157	G
39	a	2158	A
39	a	2159	G
39	a	2162	G
39	a	2163	A
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

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Mol	Chain	Res	Type
39	a	2305	U
39	a	2308	G
39	a	2309	A
39	a	2315	G
39	a	2322	A
39	a	2325	G
39	a	2327	A
39	a	2333	A
39	a	2339	C
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

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Mol	Chain	Res	Type
39	a	2513	A
39	a	2518	A
39	a	2520	C
39	a	2525	G
39	a	2529	G
39	a	2535	G
39	a	2547	A
39	a	2554	U
39	a	2566	A
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

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Mol	Chain	Res	Type
39	a	2799	A
39	a	2801	G
39	a	2818	U
39	a	2820	A
39	a	2823	A
39	a	2825	G
39	a	2849	U
39	a	2850	A
39	a	2859	G
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

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Mol	Chain	Res	Type
10	A	9	G
10	A	22	G
10	A	60	U
10	A	70	G
10	B	6	G
10	B	7	G
10	B	9	G
10	B	22	G
10	B	37	A
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

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Mol	Chain	Res	Type
16	D	1491	G
16	D	1492	A
16	D	1493	A

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

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

5.5 Carbohydrates (i)

There are no 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.

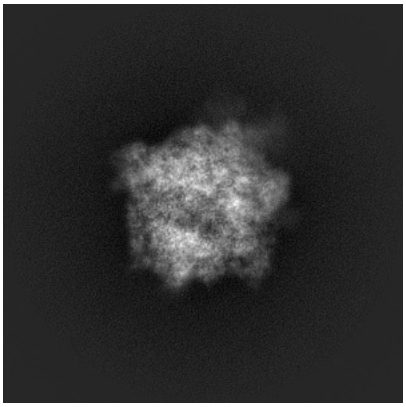
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-21468. These allow visual inspection of the internal detail of the map and identification of artifacts.

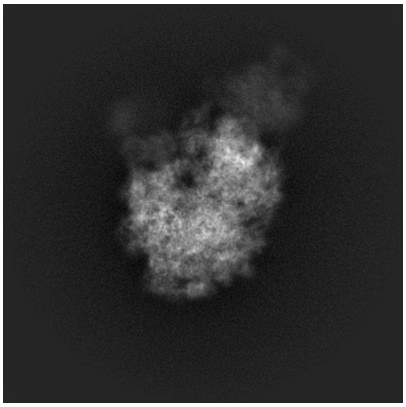
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

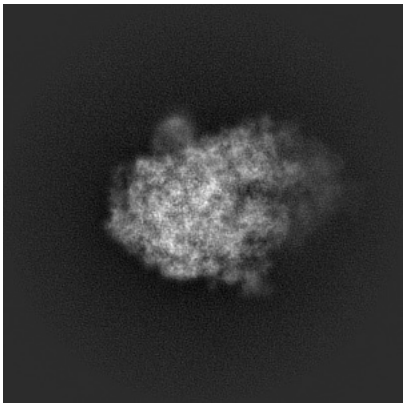
6.1.1 Primary map



X



Y

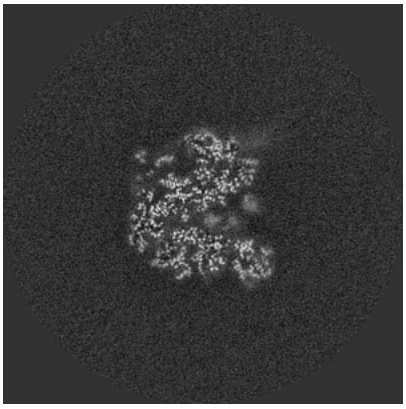


Z

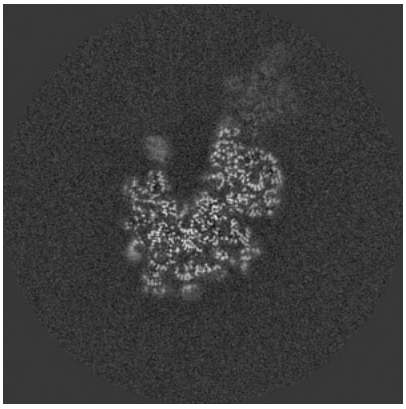
The images above show the map projected in three orthogonal directions.

6.2 Central slices

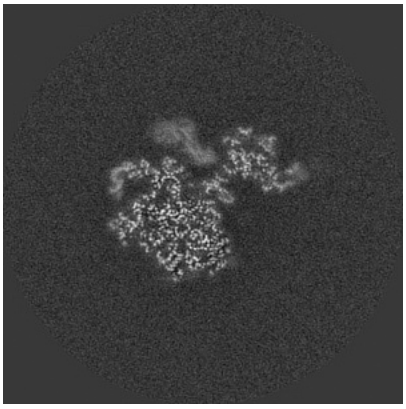
6.2.1 Primary map



X Index: 250



Y Index: 250

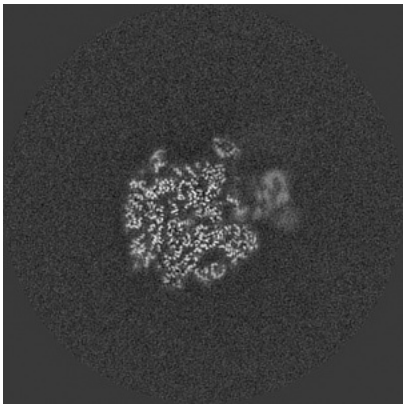


Z Index: 250

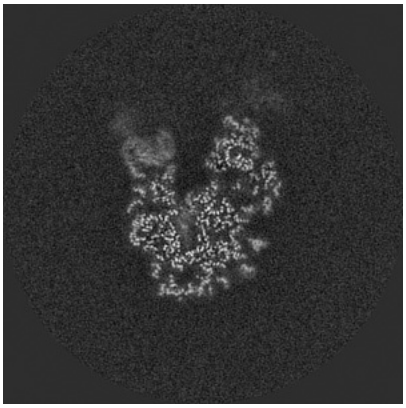
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

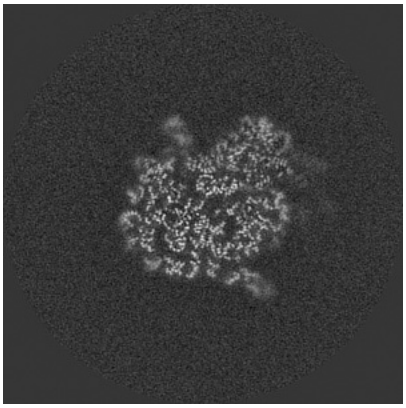
6.3.1 Primary map



X Index: 221



Y Index: 230

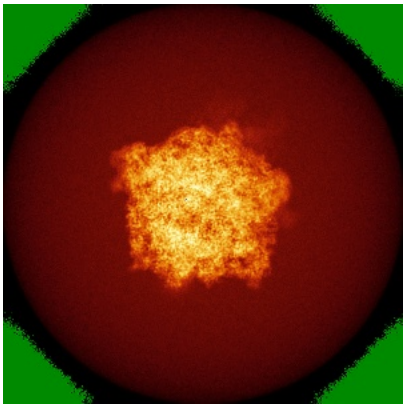


Z Index: 277

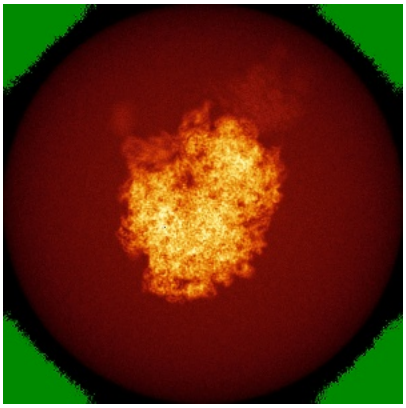
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

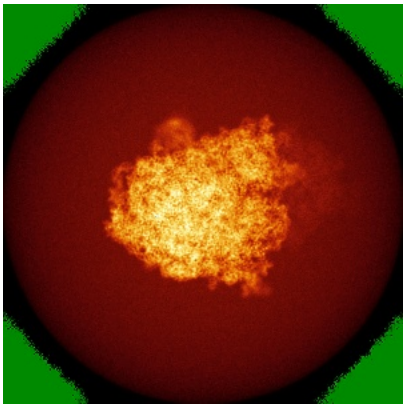
6.4.1 Primary map



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

X Y Z

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

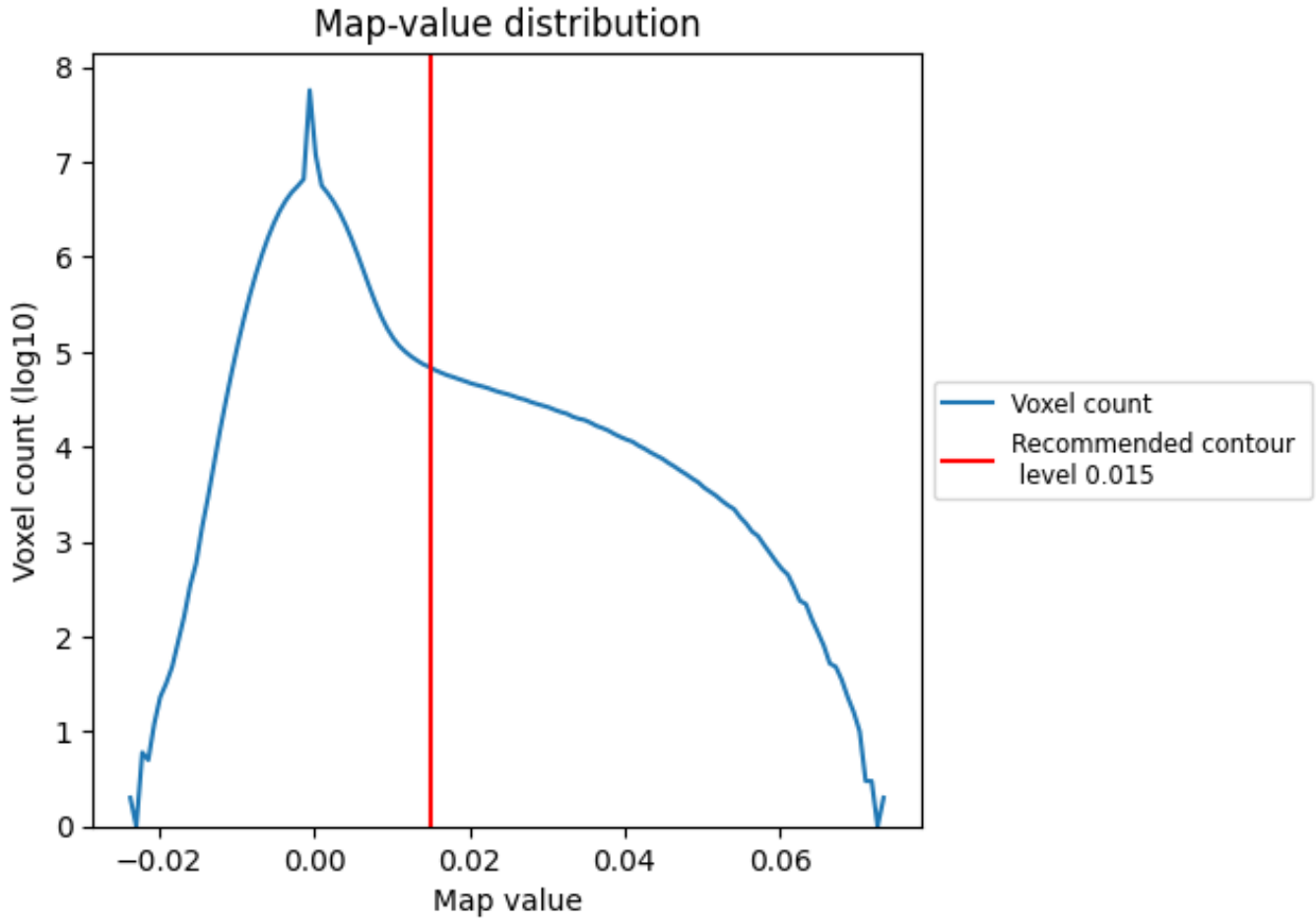
6.6 Mask visualisation (i)

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

7 Map analysis

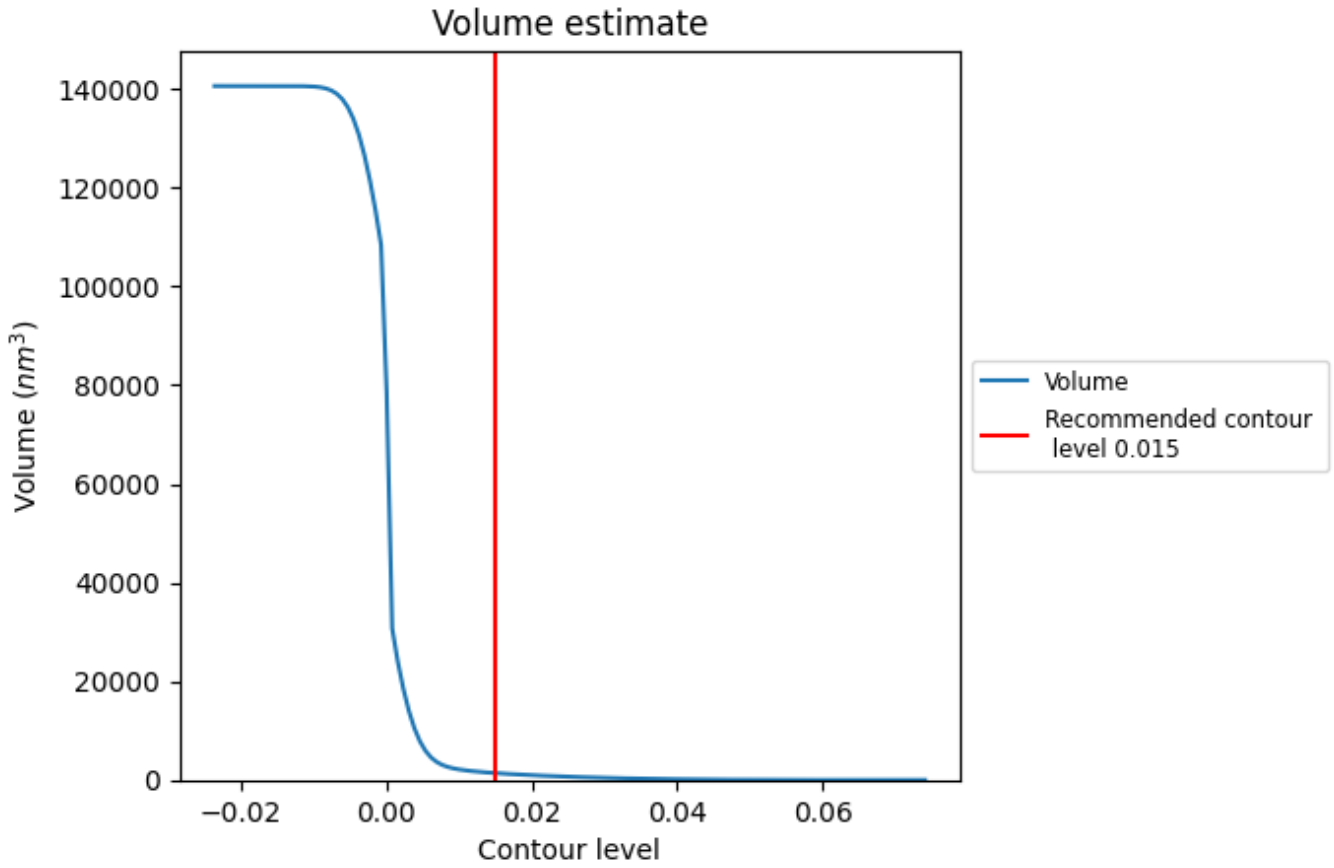
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

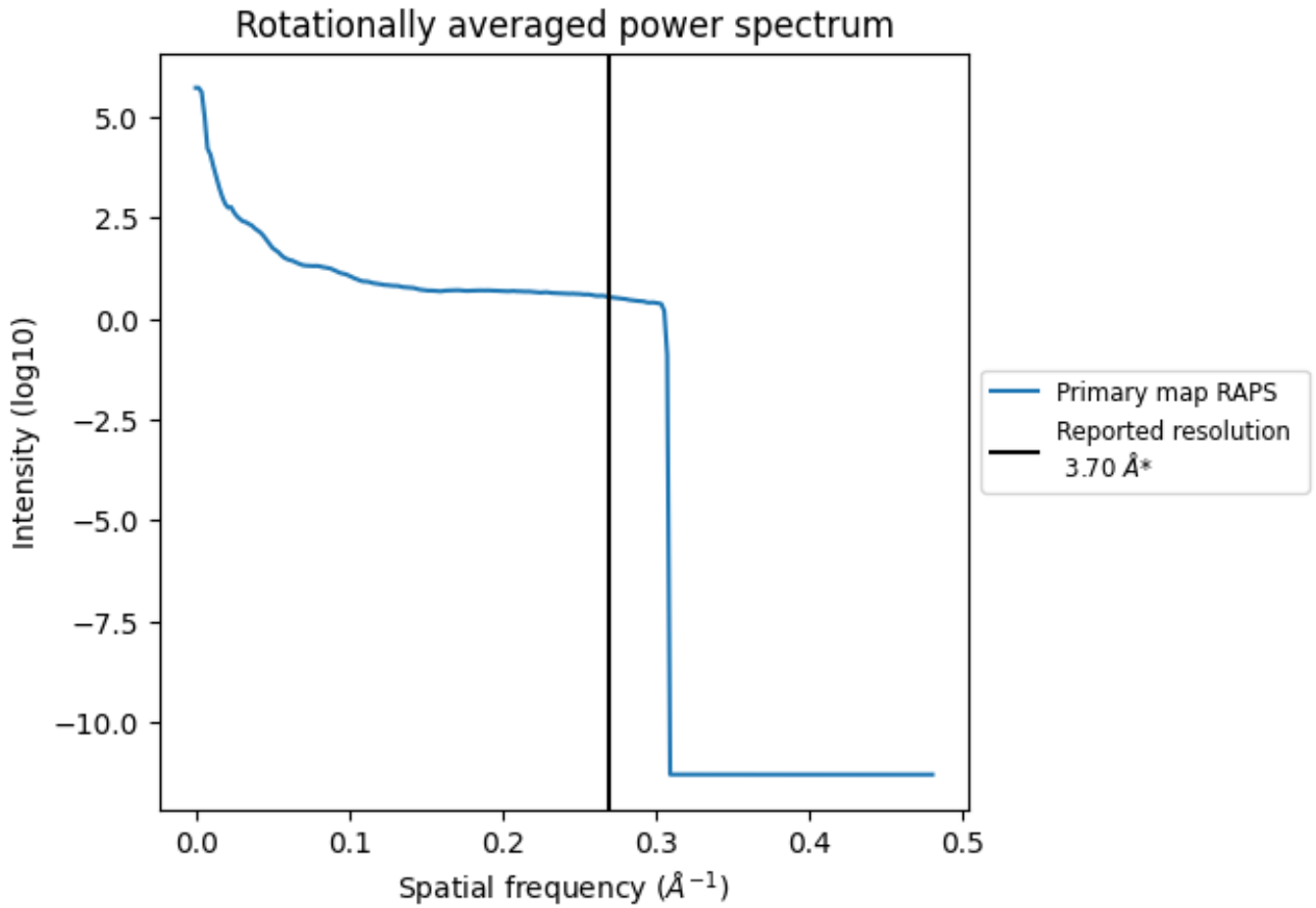
7.2 Volume estimate



The volume at the recommended contour level is 1389 nm^3; this corresponds to an approximate mass of 1255 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 $Å^{-1}$

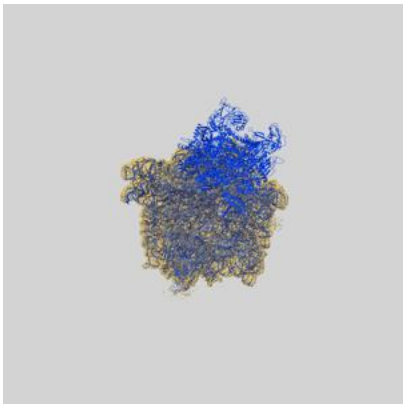
8 Fourier-Shell correlation (i)

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

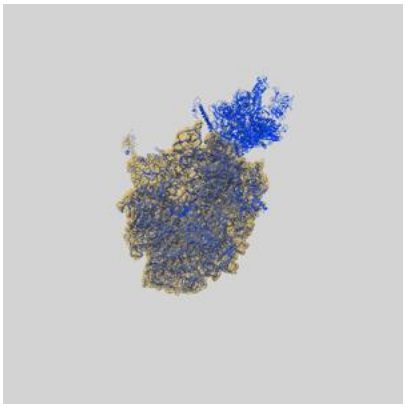
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-21468 and PDB model 6VYQ. Per-residue inclusion information can be found in section 3 on page 16.

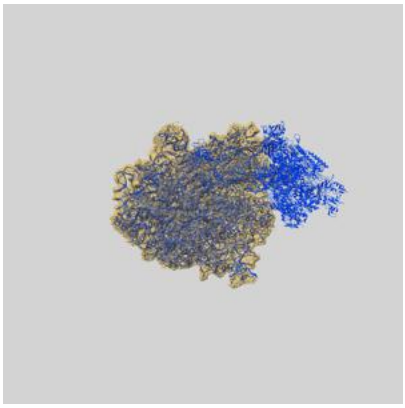
9.1 Map-model overlay



X



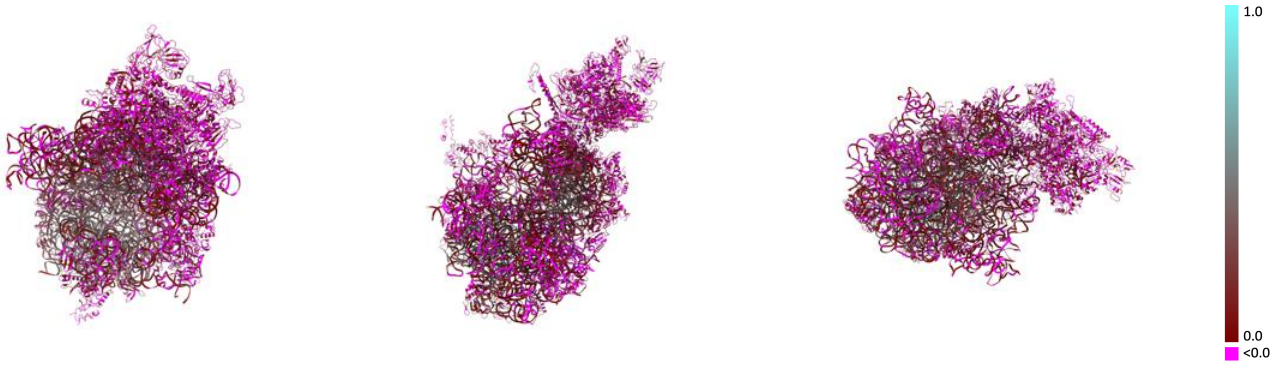
Y



Z

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

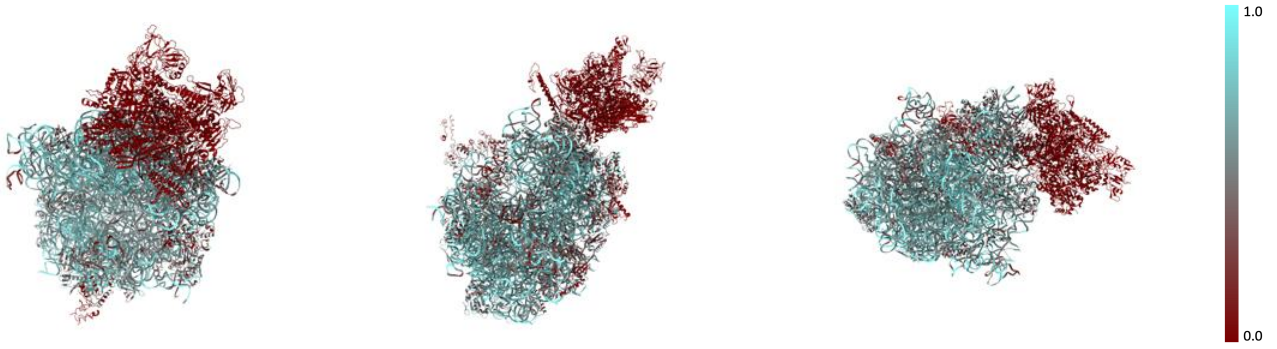
9.2 Q-score mapped to coordinate model



X Y Z

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

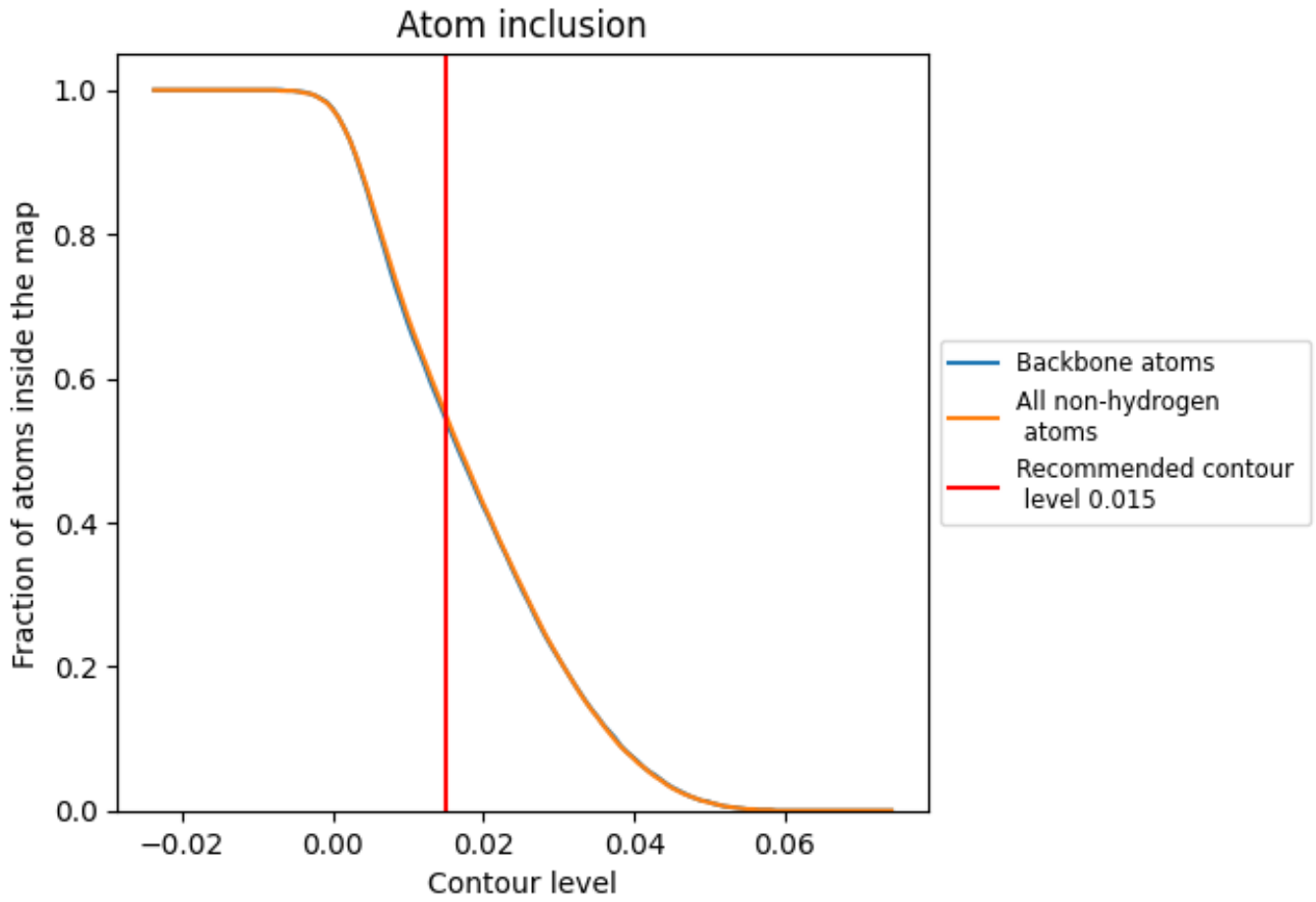
9.3 Atom inclusion mapped to coordinate model



X Y Z

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

9.4 Atom inclusion (i)



At the recommended contour level, 54% of all backbone atoms, 55% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

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

Chain	Atom inclusion	Q-score
All	0.5500	0.1250
0	0.7250	0.3280
1	0.7690	0.3950
2	0.5080	0.1070
3	0.5880	0.1340
4	0.5470	0.1360
5	0.0090	0.0800
6	0.0110	0.0650
7	0.0860	0.0210
9	0.2640	0.0340
A	0.5880	0.1520
AA	0.0050	0.0110
AB	0.0010	0.0180
AC	0.0050	0.0140
AD	0.0010	0.0070
AE	0.0040	0.0200
B	0.4120	0.0460
C	0.4610	0.0530
D	0.7590	0.1790
E	0.4820	0.0710
F	0.4870	0.1620
G	0.4090	0.0170
H	0.0430	0.0150
I	0.4150	0.0520
J	0.4670	0.0580
K	0.5550	0.1520
L	0.4120	0.0150
M	0.4530	0.1010
N	0.5230	0.0910
O	0.4730	0.0580
P	0.4550	0.0570
Q	0.5820	0.1640
R	0.6830	0.2960
S	0.4610	0.0530
T	0.5750	0.1330

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Chain	Atom inclusion	Q-score
U	0.4190	-0.0050
V	0.5630	0.1350
W	0.3030	-0.0290
X	0.3500	0.0010
Y	0.1850	0.0360
Z	0.0040	-0.0850
a	0.7420	0.1650
b	0.4810	0.0580
c	0.4760	0.0420
d	0.6760	0.0620
e	0.4540	0.0480
f	0.6970	0.2870
g	0.3070	-0.0250
h	0.3940	-0.0360
i	0.7620	0.3590
j	0.6350	0.2290
k	0.3330	-0.0410
l	0.5720	0.1880
m	0.6900	0.2170
n	0.3680	-0.0230
o	0.4870	0.0990
p	0.4530	0.0510
q	0.5930	0.1860
r	0.2310	-0.0210
s	0.7530	0.3600
t	0.4670	0.1010
u	0.5230	0.1320
v	0.5630	0.1420
w	0.6490	0.2020
x	0.3750	-0.0530
y	0.4510	0.0480
z	0.8150	0.4170